



FLIGHT



&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT.

IN the course of a speech delivered at the opening of the Enemy Aircraft Exhibition at Islington, reported fully in the last issue of "FLIGHT," Lord Weir gave a very interesting summary of the development and work of the Air Services during the War. After dealing with the various aspects of the task now so happily ended, he passed on to the future. He was not a pessimist, he said, in regard to commercial aviation. The possibilities were great, the probabilities not so great. He referred, of course, to the immediate probabilities of the future. A word of caution was necessary to those who predicted an immediate far-reaching and successful development of commercial aerial enterprise. The actual practical limitations were still great, and just as at the beginning of the War we had to look forward to a period of pioneer work for military aviation, so we must look forward to pioneer work in commercial aviation. In that work, which would be extensive, the State must

play a large part and must continue to play a part. It had supported the industrial development of aviation throughout the War, and he considered that it must assist that development and training until commercial aviation was well on its feet. He was in a few days meeting representatives of British aircraft manufacturers, and had hopes that by discussion and agreement with them methods might be devised by which the State might be enabled to lend its support to the industry in the difficult times which were coming. He could promise that the existing restrictions on the activity of those who desired to be energetic in commercial aviation would be removed very quickly indeed.

Lord Weir did well, we think, to utter a caution regarding undue optimism in the matter of immediate development. We ourselves have enunciated a similar warning on more than one occasion, pointing out that the practical certainty of being able to establish aerial services generally is not quite the same thing as educating the public up to the point of subscribing funds for the establishment of such service or of taking advantage of their facilities when they have become accomplished facts. With all submission to Lord Weir as an authority, we think it would have been better if he had made it clear that the practical difficulties are not really great. The experience gained during the War has enabled us to make such progress in the constructions of engines and machines and to so develop their power that it is not overstating the facts to say that, given the organisation, it would be practically possible to start a mail and passenger service to India to-morrow. So far as concerns the immediate commercial probabilities, however, as we have insisted in the past, we shall have to carry out a good deal of propaganda work in the popularisation of aviation, for reasons that have been set forth in detail in these pages before, and in the present instance in our comments on the work of the Civil Aerial Transport Committee.

Although the Report of this Committee has not yet been published and probably will not be until the New Year, it has been presented to Parliament, and a forecast was printed in *The Times* on Monday last. Accepting *The Times* forecast as approximately correct, the full text of the Report promises to be exceedingly interesting.

A number of most important conclusions are drawn, which are likely to have very far-reaching effects if they are accepted as the basis of our future aerial policy.

First in order of importance are the clauses dealing with what may best be described as State policy in relation to the industry. This appears to have been discussed in great detail both in the Main Committee and in several of the smaller committees into which the former was for convenience divided. The basis of discussion was whether commercial flying is to be undertaken as a great experiment in State Socialism, or whether it is to be entrusted to individual enterprise, supplemented by the assistance of the existing military organisation or the exercise, in the case of landing stages, by the State of the power of compulsory purchase. Some members of the Committee were strongly in favour of the State experiment, but the Committee No. 1, presided over by Lord Sydenham, reported in favour of State encouragement of private enterprise and against the idea of experimenting in State Socialism. Apparently the Committee as a whole takes the view that the industry should be as free from State control as possible. A private firm, it is urged, can properly risk its capital in exploiting a promising new invention or in development, but the State would be in a position of a trustee, and would have to think twice or thrice before risking funds, and would, moreover, be responsible to Parliament for its action. During the War, it is true, the Air Ministry has made many bold experiments, but it is pointed out that it was untrammelled by Parliamentary control, and has been free to incur expense which would be unthinkable in peace time.

As a matter of fact, this is simply another and perhaps more polite way of expressing the views that have been laid down from time to time in the pages of "FLIGHT." Were the State to take hold of commercial aviation and endeavour to carry out the work of development, which is properly the task of private enterprise, we should be in for an era of absolute stagnation. Progress would, in the very nature of things, be almost completely absent for the reasons set forth by the Committee. The mere fact that all expenditure is subject to Parliamentary control *ipso facto* discourages experiment, and, as it is abundantly clear that commercial aviation will be for some time to come in the nature of an experiment, it is easy to see how stagnation must ensue from too close a control by the State. It is impossible to visualise a great State-owned monopoly of aviation really going out to develop it into a serious business. Mail lines would undoubtedly be established, and to a small extent it is possible that the State would open up passenger services of relatively limited scope in connection with these. But that it would experiment with types in order to tempt the travelling public and the commercial community to transfer its patronage from the railway and the steamship to the aerial lines is highly improbable. The State does not work for a dividend, and therefore does not exhibit any enterprise at all. If it broke through its golden rule in the case of aerial development we should think the age of miracles had returned, and we dare not trust to that happening, apart altogether from the numberless other considerations which would have to be weighed before a decision could be taken to make aviation into a State monopoly.

Naturally, it is quite impossible to forecast what the attitude of the Government will be when Parliament has to decide on the future status of aviation, or what vested interests will intervene in the struggle of the industry to free itself from its present trammels. But we have this to the good: that the Government's own Committee pronounces against the idea of a State monopoly, and in favour of a large measure of freedom.

Some Other Matters

The principal questions which seem to have been discussed by the No. 1 Committee—the most important of all—had special reference to:—

- (1) The attitude to be adopted by the State with regard to national sovereignty in the air, and international questions connected with aerial transport.
- (2) The question of State ownership (if any) or of necessary State control and regulation of Customs, quarantine and aliens.
- (3) Necessary amendment of the common and statute law as to the air covering private property and as to compulsory purchase of land for aerodromes and landing grounds.
- (4) The principles of liability for damage caused by or to aircraft.

All these are questions of the greatest interest inasmuch as they will exercise a dominating control over the conditions under which commercial aviation must be developed in the future. At the moment, however, they cannot usefully be discussed here. They are questions primarily for the authorities on international and other law, and not until we see in detail what the recommendations of the Committee are will it be possible to express anything in the nature of balanced opinion.

Committee No. 2 appears to have come to the conclusion that the use of aircraft will be advantageous:—

- (1) In the case of mails, by competing with the telegraph service, or by establishing a new kind of express letter service.
- (2) In the case of passengers, by affording rapid transit over long distances, particularly where the journey includes a sea crossing, and
- (3) By enabling ordinary merchandise, commercial samples, etc., to be carried more rapidly than by any other means.

The Committee, however, came to the conclusion that probably one of the first methods of employing aeroplanes for the transport of passengers might lie not in a regular service, but in the occasional and increasing use of single machines for rapid journeys, and this appears to be the general line upon which development may be expected to take place. There is no occasion to cavil at these conclusions. They are quite possibly entirely correct, and that what we have called the propaganda part of development will very largely take the shape of the gradual creation of public confidence in aerial transport by means of these single or modified passenger services. We cannot expect to step right out of the War and find the public ripe to take full advantage of the enormous latent facilities of aviation. The education process must be more or less gradual—how rapid or how slow depends very largely upon the ability with which the propaganda is conducted. We shall await the publication of the report itself with impatient interest.

**Hendon
as
Propagandist**

As to our way of thinking, it is above all necessary that there should be begun without delay a vast propaganda in connection with the movement. It seems to us that the very first thing to be done is to re-establish the public flying grounds. As we know, when the War broke out Hendon had become one of the most popular, and withal the most fashionable resorts in the country. The art of flying was then relatively in its infancy, and what was known and appreciated of the science was entirely due to the popular interest created by the purely sporting side of the movement as exemplified by Hendon, Brooklands, and the rest of the flying grounds scattered up and down the country. If we desire to revive and maintain the interests of the public in flying—and it is essential that we should do so—these grounds and more besides must be recreated out of the chaos caused by the War. A beginning should, however, be made at once with the old-established grounds. All these are at the moment in the hands of the military authorities, and we fully recognise that their evacuation by them is not a matter that can be carried through in a day or a week, but we do submit that when the time comes to put into force the demobilisation schemes that have been prepared, the priority of return to their former owners should be given to such of these grounds as were used for purposes of aerial sport before the War. In this matter we have no axe of our own to grind. It simply strikes us that the educational value of such establishments as Hendon is likely to be incalculable, and, that being so, the responsible authorities should take into immediate consideration the immense amount of good that is likely to accrue to the industry and the movement generally from an early resumption of normal activity at these places. For our own part, we should like to see provision made for the establishment of what we may call sporting aerodromes in the vicinity of every town in the country. Doubtless that will happen ultimately, but it cannot be done in an hour, so in the meantime we are pleading for a restoration of the ancient landmarks of aviation. There is a lot more in it than meets the casual eye, and we are confident that if the authorities are properly approached they will see the matter in the light in which it strikes us, and will do what they can to follow the suggestion we have put forward.

**An
Aero Show
in 1919**

The S.M.M.T. has lost no time in announcing that the series of exhibitions held under its *ægis* before the War shall be resumed now that peace has come again. An Aero Show will be held at Olympia some time in 1919. Like the surrender of the German fleet, it seems almost too good to be true. For more than four years all our thoughts have been turned to the making of war. It is true that in the specialist sense those thoughts have been mainly associated with aircraft and their development as fighting machines, and to a somewhat less extent, perhaps, to their commercial possibilities at the end of the

War. But the latter had lasted so long and the end seemed so far off that the matter of exhibitions was one that practically never entered the mind. And now, as though to clinch the news that the War really is at an end, comes the announcement that we are really to have a Show within the next few months!

How different a Show it will be in comparison with the anæmic affairs of before the War! Then, it was hopeless to try to get the general mass of the public to take enough interest in aviation to spend a shilling and a railway fare to see the latest developments in aircraft staged at Olympia. The man in the street knew nothing at all about the science of flight. He may have once seen an aeroplane in flight, but even that was not at all certain. It did not particularly interest him, because it was a thing that was not general or promised any immediate prospect of taking an aspect of general usefulness. The complete knowledge of the possibilities was, in a word, confined to the few on the inside of the movement. Therefore, the initial attempts made to arouse enthusiasm through the medium of exhibitions were disastrous failures, both financially and from the point of view of interest. The conditions that will obtain next year are, however, completely different, and we foresee a popularity for the Aero Show comparable to that of the Motor Show at its zenith. Everyone knows more or less about flying now, and everyone is interested in some way or other. There are few in the country who have not either personally or through their sons, brothers or husbands or even their wives or daughters, had some close personal interest in the flying services. These will flock to Olympia to view the latest developments in aircraft and will gain a vastly enhanced interest from the intelligent understanding with which they will approach the exhibition. We feel safe in prophesying a really great success for the Show because of the wide understanding of aerial matters which exists among the people. We can take the growth of the Motor Show as a justification of the point of view.

It may be remembered that when public understanding of the car was small the shows were attended very sparsely indeed, and then mainly by those having a direct interest in the trade, but directly the average person began to know exactly what he was looking at, nothing would keep him away from Olympia during Show Week. So, we are convinced, will it be in the case of the Aero Show of 1919—subject however to the proviso that it is an aviation show and not a heterogeneous gathering together of wildfowl from the land, sea and air; and in this connection what of the promised show of the Society of British Aircraft Constructors? Is this to be a second (or first) Aero Show, or to be combined on the Olympia floor or what? It would be well that some sort of intimation should be forthcoming authoritatively upon the point, so that constructors, the public and all others interested may know what to look forward to.

Thanks from Belgium

THROUGH Admiral Keyes, of the Dover Patrol, the King of the Belgians has sent to the 5th Group, R.A.F., "an expression of his admiration for the great bravery and skill they displayed in carrying out the task allotted to them under the most difficult and dangerous weather conditions."

From the Belgian Army command comes a tribute to the work of the R.A.F. who co-operated during the Anglo-

Belgian offensive in Flanders, and recognises that "they greatly contributed to the success of the Belgian Army in its first great offensive."

U.S. Air Director Resigns

It was announced in Washington on November 24th that Mr. John D. Ryan had resigned his position as Director of the Air Service on the ground that his work for the Government was drawing to a close.

NOTES ON GERMAN BOMBERS

THE FOUR-ENGINED GIANT

[Issued by Technical Department (Aircraft Production), Ministry of Munitions.]
(Continued from page 1322.)

THERE are known to be a number of different types of giant bomb-carrying aeroplanes, distinguished by the four, five, or six engines with which they are fitted.

Examples of four-engined and five-engined aeroplanes have been brought down, but unfortunately, in all cases, in such a damaged condition that complete reconstruction is impossible.

The following particulars relate to a four-engined machine which landed near Betz on the night of June 1st.

It was almost completely burnt by its occupants, and the metal parts alone remain, together with a few fragments of the body work.

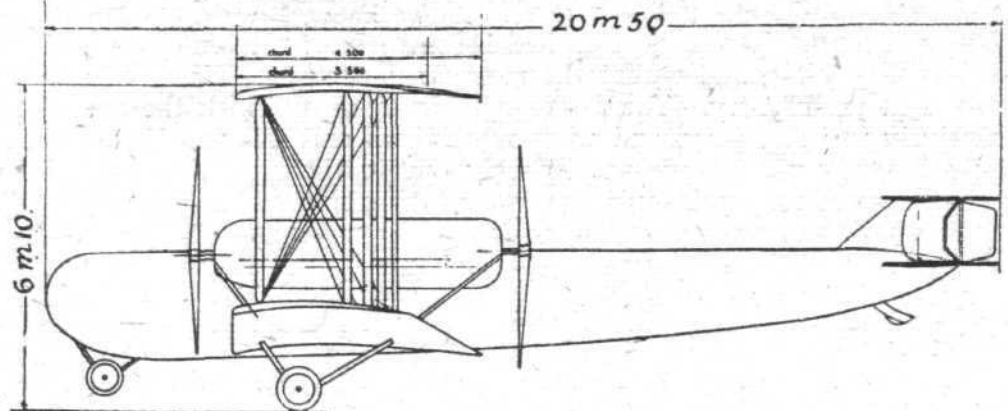


Fig. 44.—Side elevation of four-engined giant.

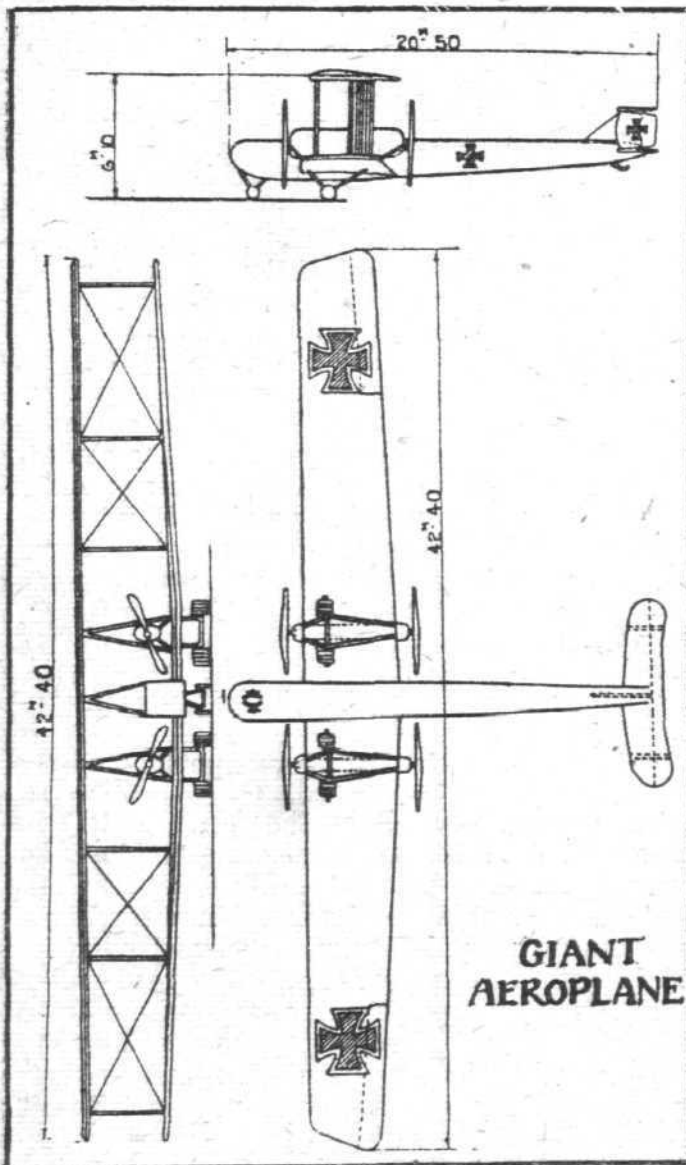


Fig. 42.—General arrangement drawings of the four-engined giant.

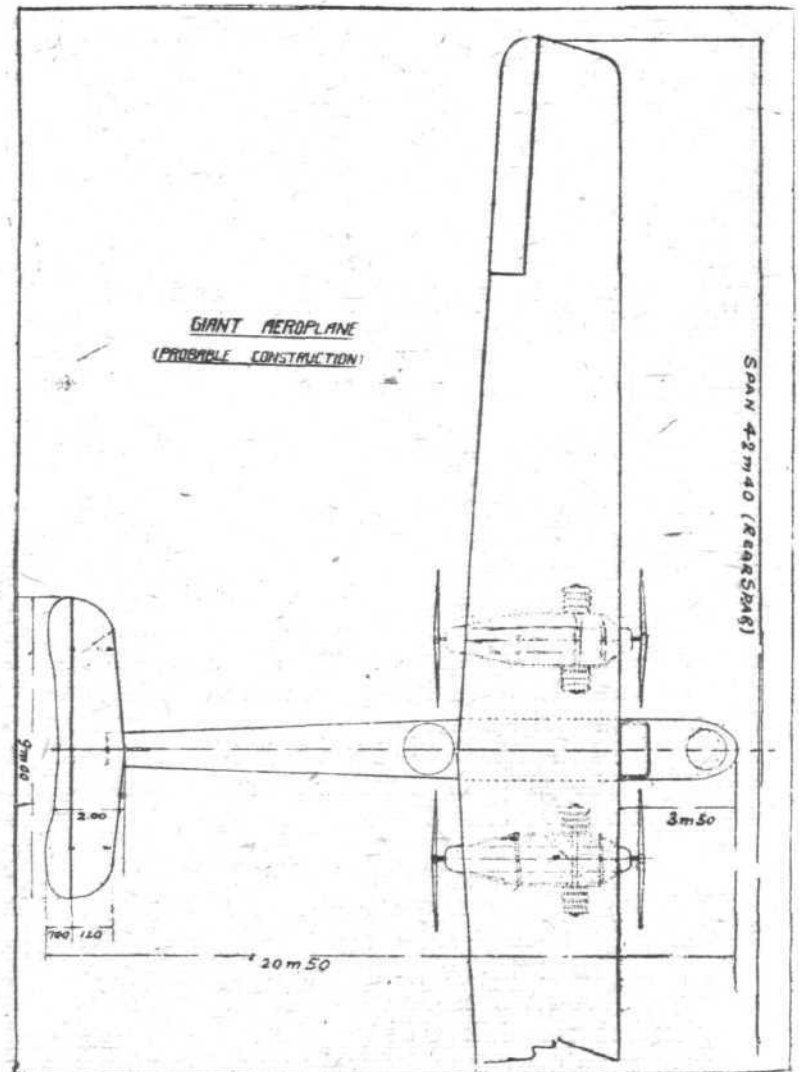


Fig. 45.—Plan view (probable construction) of four-engined giant.

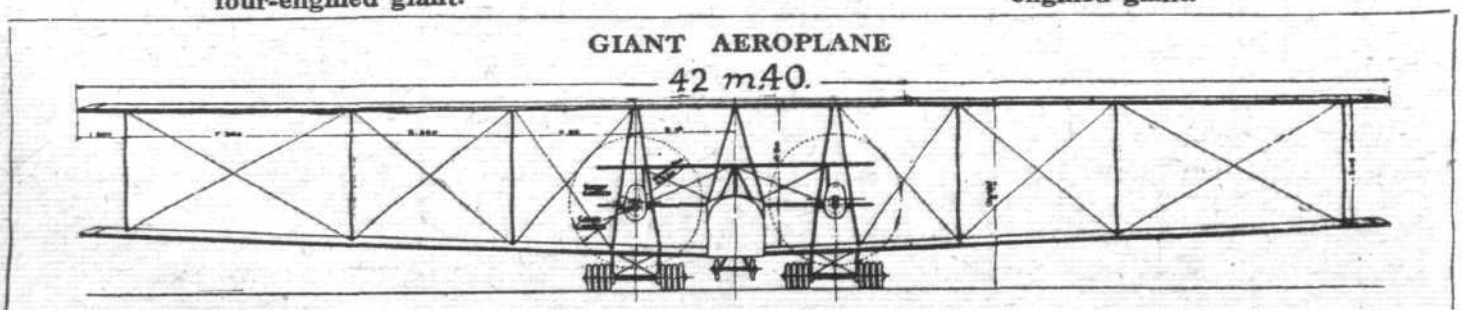


Fig. 43.—Front elevation of four-engined giant.

The general arrangement of this aeroplane, together with the principal dimensions, is given in the accompanying drawings (Figs. 42, 43, 44 and 45).

In contradistinction to the two-engined machine, there is considerably more steel in the construction, and this material is used in place of wood for the rear portion of the fuselage.

The principal point of interest is the mounting of the four engines, all of which are of the 260 h.p. Maybach type, six cylinders in a line; the horse-power has been forced up to 300, giving 1,200 h.p. in all. They are placed end to end, as shown in Fig. 46, and each drives a separate screw.

In order to bring the centre of gravity of the machine sufficiently far forward, the weight of the two engines is massed towards the leading edge of the main plane; by driving the screws through shafts and reduction gears, the necessity of cutting away large sections from the planes to give room for the rear propellers has been avoided.

The arrangement of the engine unit on each side of the fuselage is diagrammatically shown in Fig. 46, from which it will be seen that the two engines are placed close together, and that the rear motor is some little distance away from its screw. The forward engine is, however, mounted close up to the tractor screw.

The employment of shafts and reduction gears necessitates fly wheels on the engines. These are .4 metre in diameter, and made of cast iron. The tubular driving shafts between the fly wheel and the gear box are furnished with flexible leather couplings. These are of a novel type, and consist of a male and female drum, each furnished with circumferential notches, between which are interposed a series of flat leather strips. The female drum forms part of the fly wheel.

The gear box consists of a casing of aluminium, provided with cooling fins, which may be seen in Figs. 47 and 48.

Beneath each gear case is a small radiator for cooling the lubricating oil circulated through the engine. This radiator can be seen in Fig. 47, and consists apparently of a flat semicircular tank, fitted with numerous transverse tubes of fairly

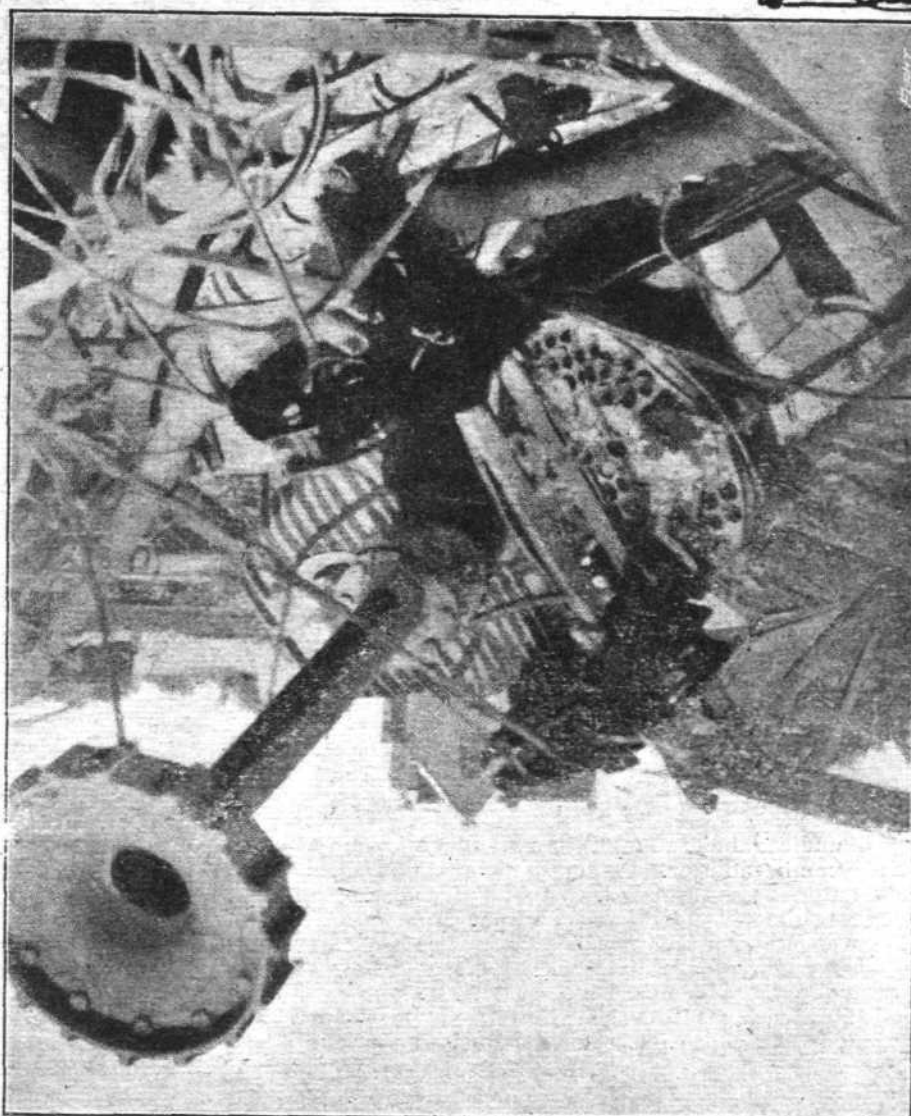


Fig. 48.—Gear-box and shaft of four-engined giant.

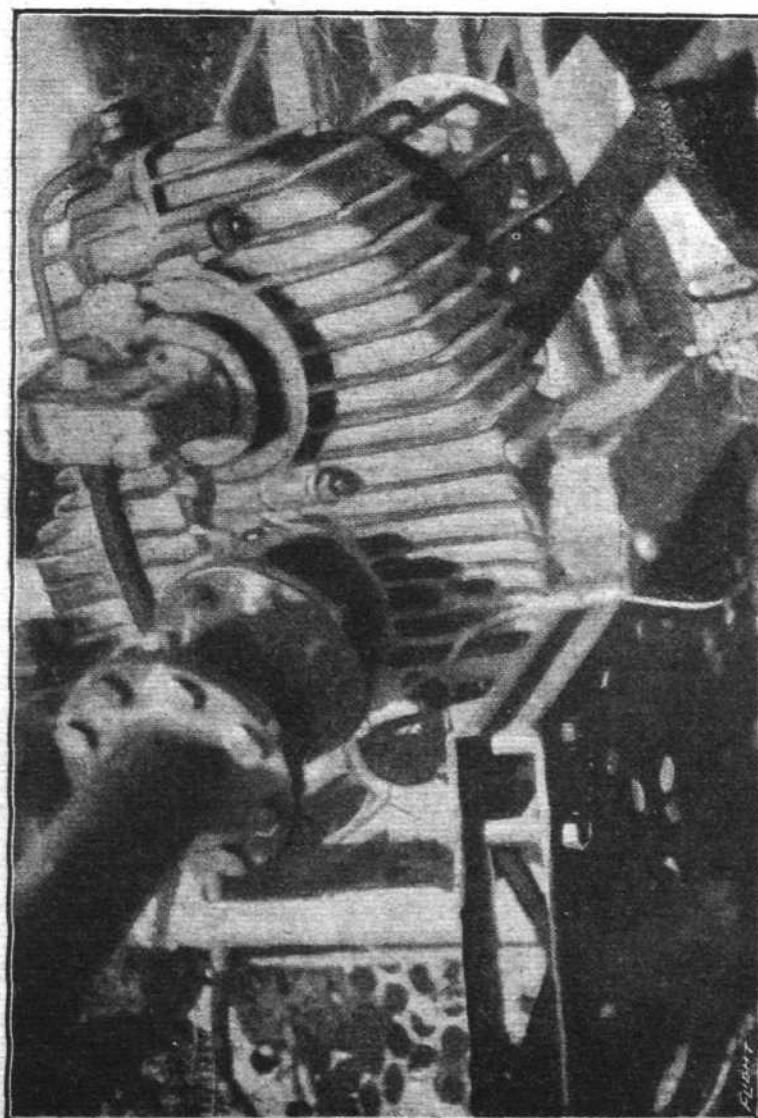


Fig. 47.—Gear-box and oil radiator of four-engined giant.

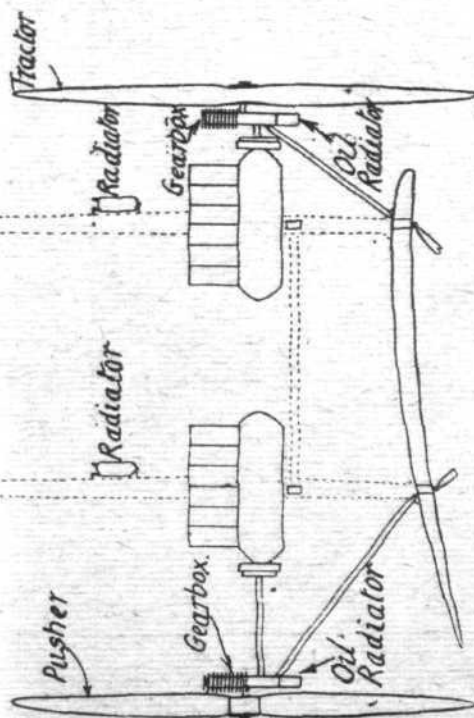


Fig. 46.—Engine mounting of four-engined giant.

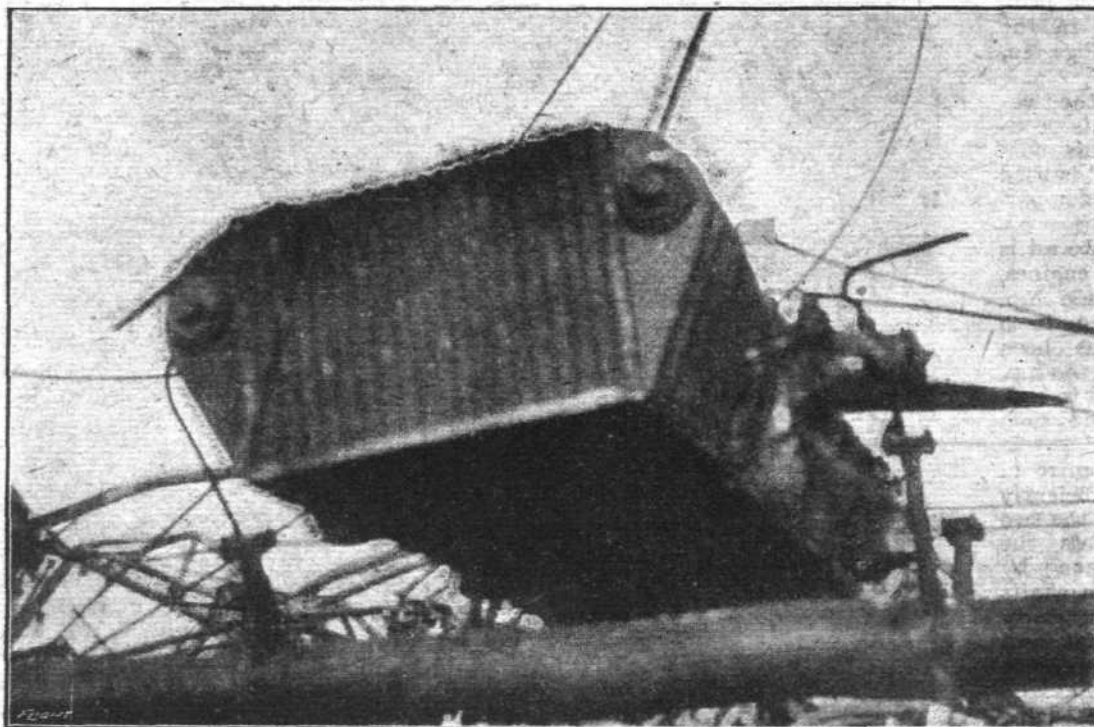


Fig. 49.—Radiator of four-engined giant.

large diameter (about 20 mm.) in a manner similar to that of a honeycomb radiator. A pump mounted at the base of the radiator is also furnished with an electrical thermometer, giving a reading on a dial in the cockpit.

Each engine is fitted with a self-starting arrangement of the type usually fitted to Maybach motors. The exhaust pipe may be closed by means of a shutter, and all the cylinders can be filled with gas from the carburettor by means of a large hand-pump, for which purpose all the valves are held open. When these valves are closed, and the starting magneto

operated, the engine fires and continues running. Each engine has its own radiator (Fig. 49), which is mounted directly above it, and supported by struts and stay wires at a point about half-way between the top and bottom planes. These radiators are of the type usually fitted to D.F.W. machines. They are rectangular in shape, with their greater length placed horizontally, and the radiating surface consists of a series of zig-zag tubes placed vertically.

The engine bearers consist of stout ash spars, reinforced with multi-ply wood. Owing to the burnt condition of the

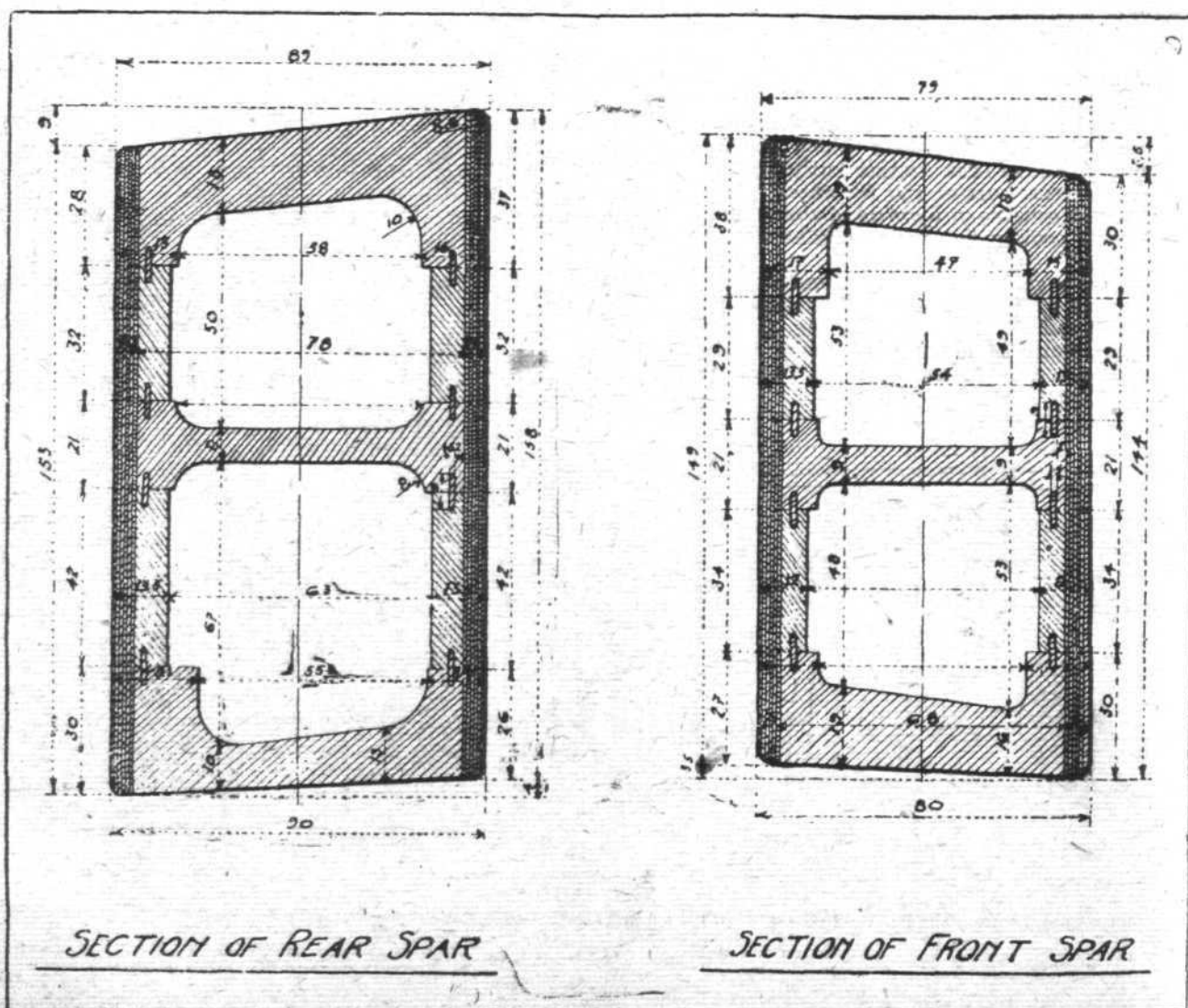


Fig. 50.—Spar sections of four-engined giant.

machine no information could be obtained as to the engine controls, and the screws were also too badly damaged to yield definite

information as to dimension and construction, though they appear to be made chiefly of ash and covered with a thin veneer.

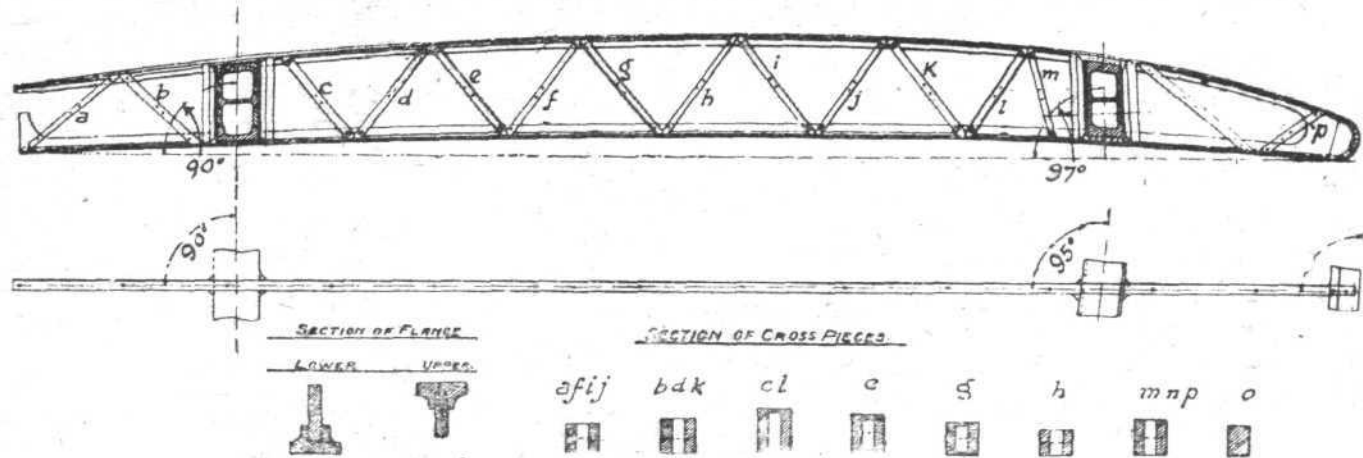


Fig. 51.—Rib of four-engined giant.

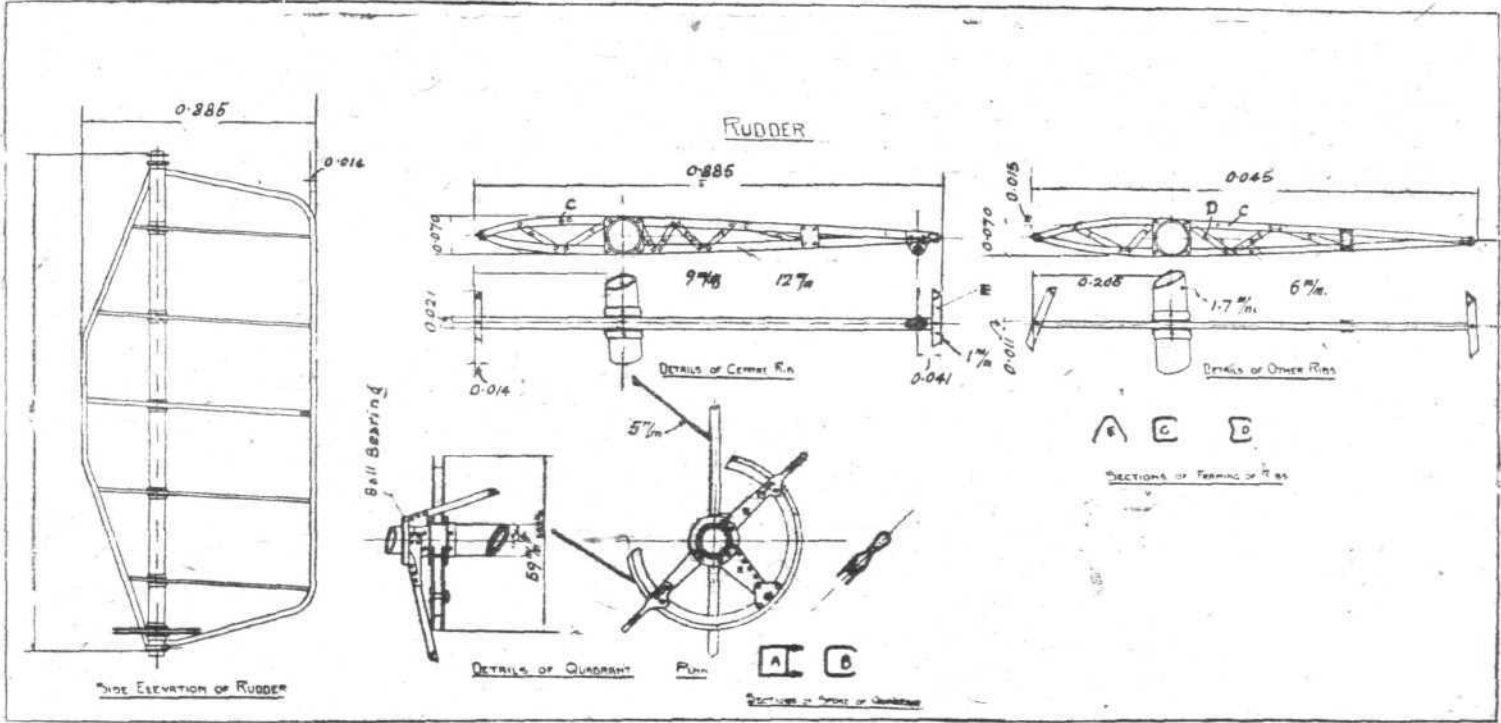


Fig. 52.—Rudder of four-engined giant.

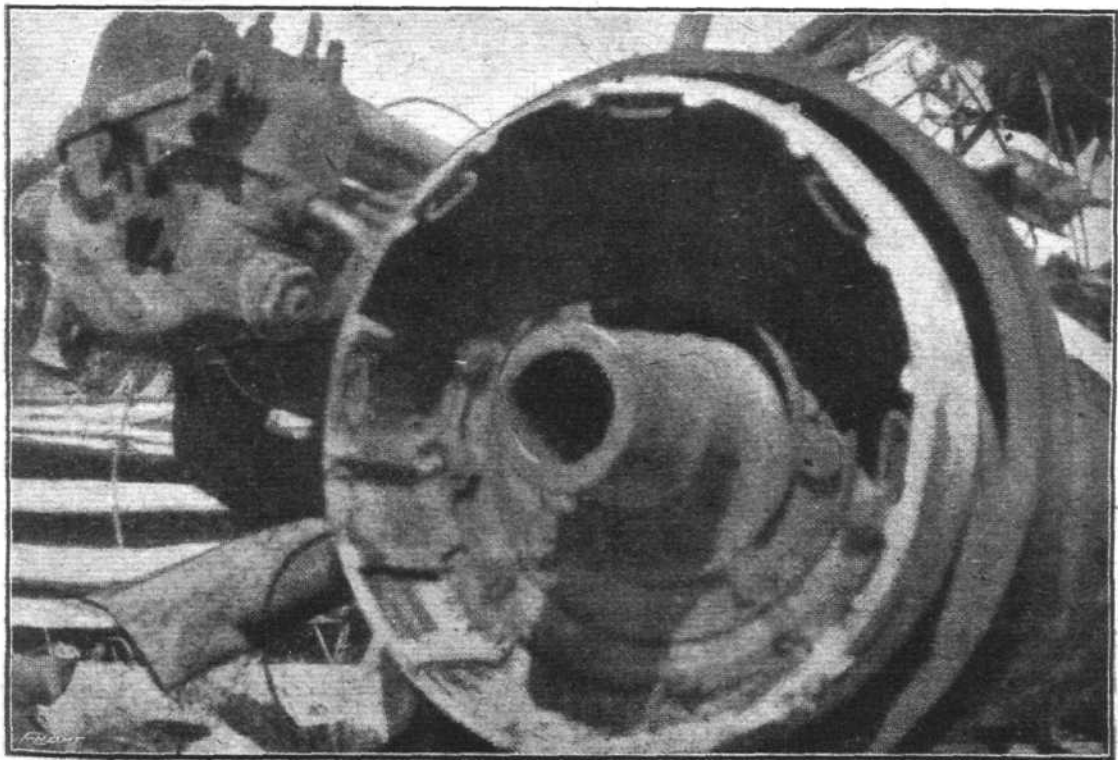


Fig. 53.—Fly-wheel and female clutch of four-engined giant.

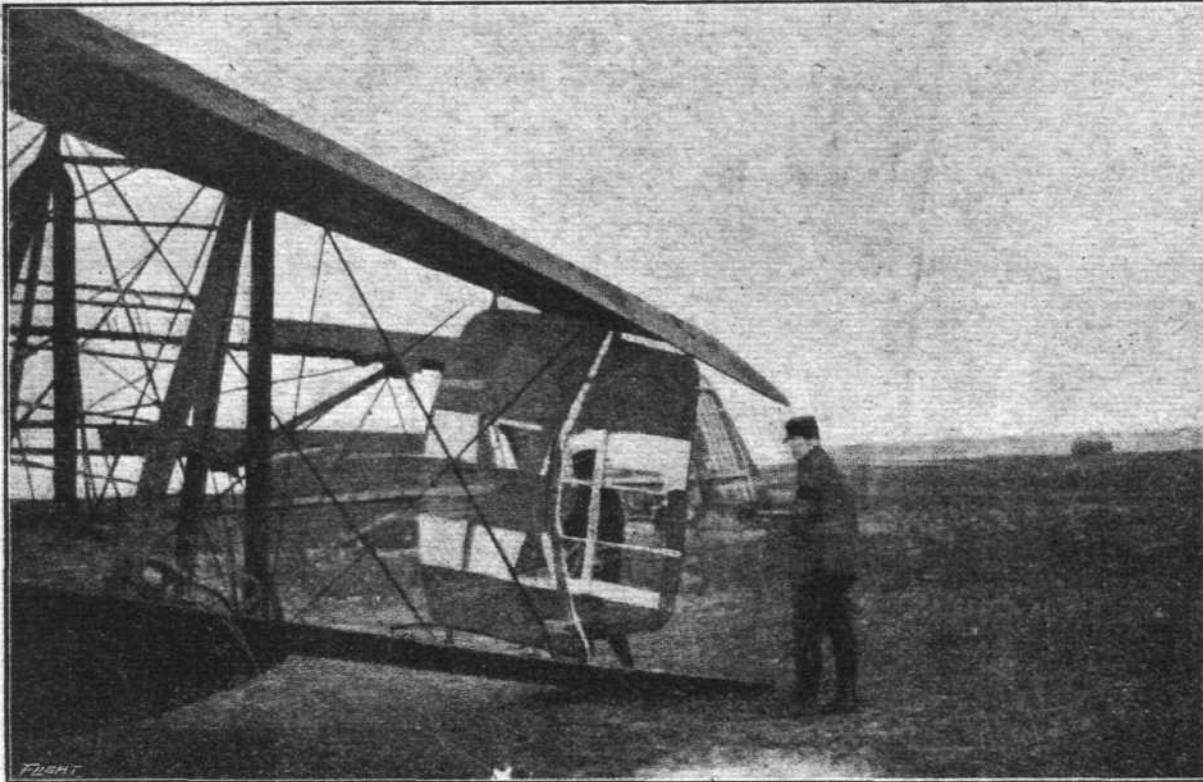


Fig. 54.—
Empennage
of four-
engined
giant.

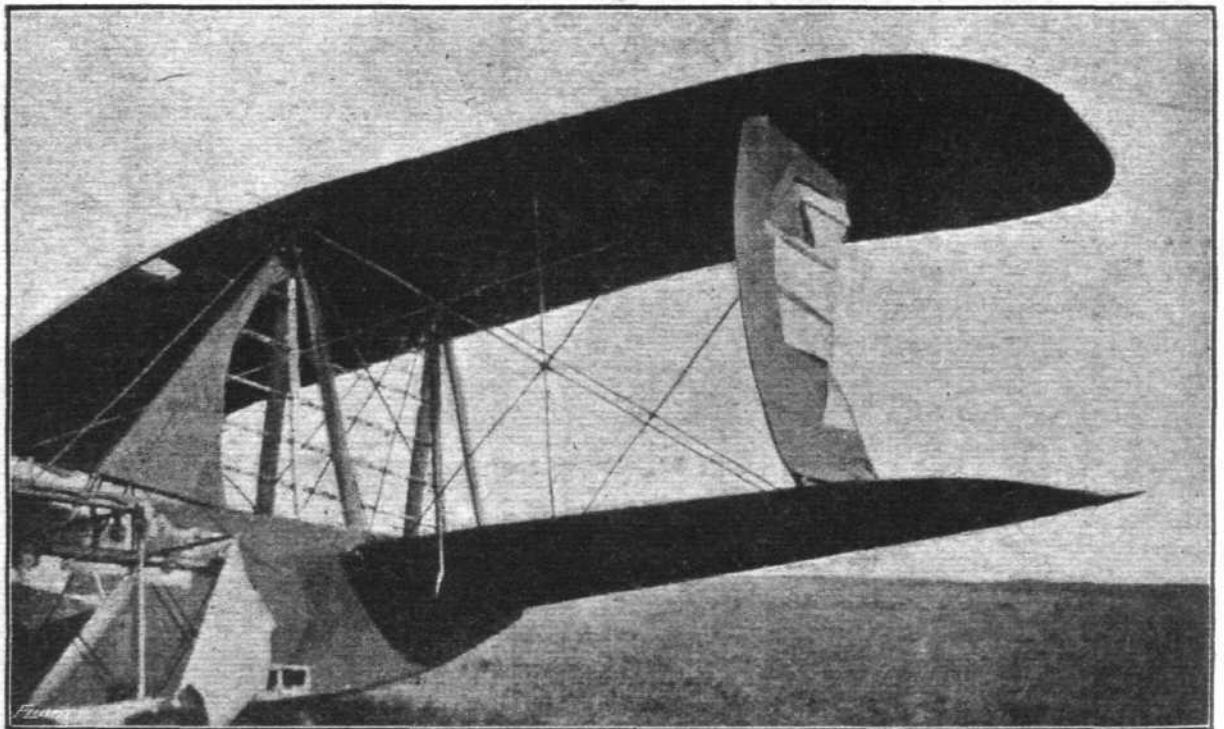


Fig. 55.—
Empennage
of four-
engined
giant.

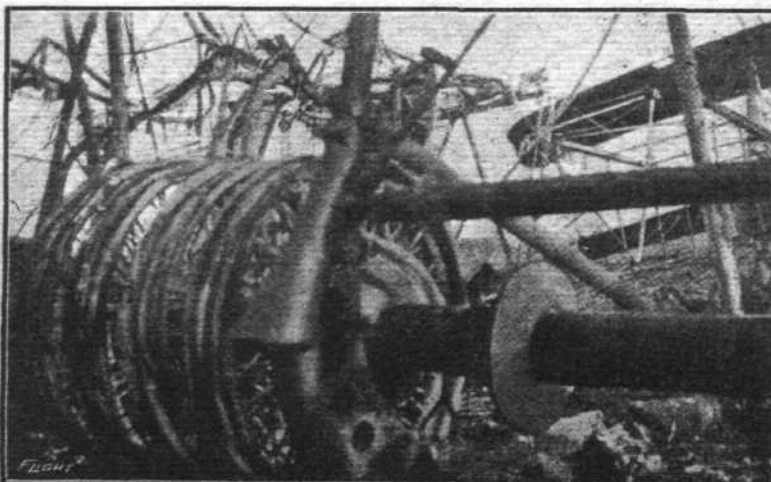


Fig. 56.—Undercarriage of four-engined giant.

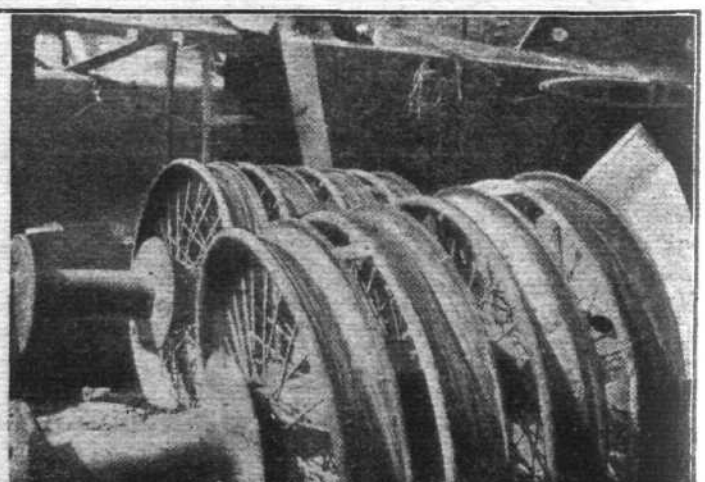


Fig. 57.—Axles and wheels of four-engined type.

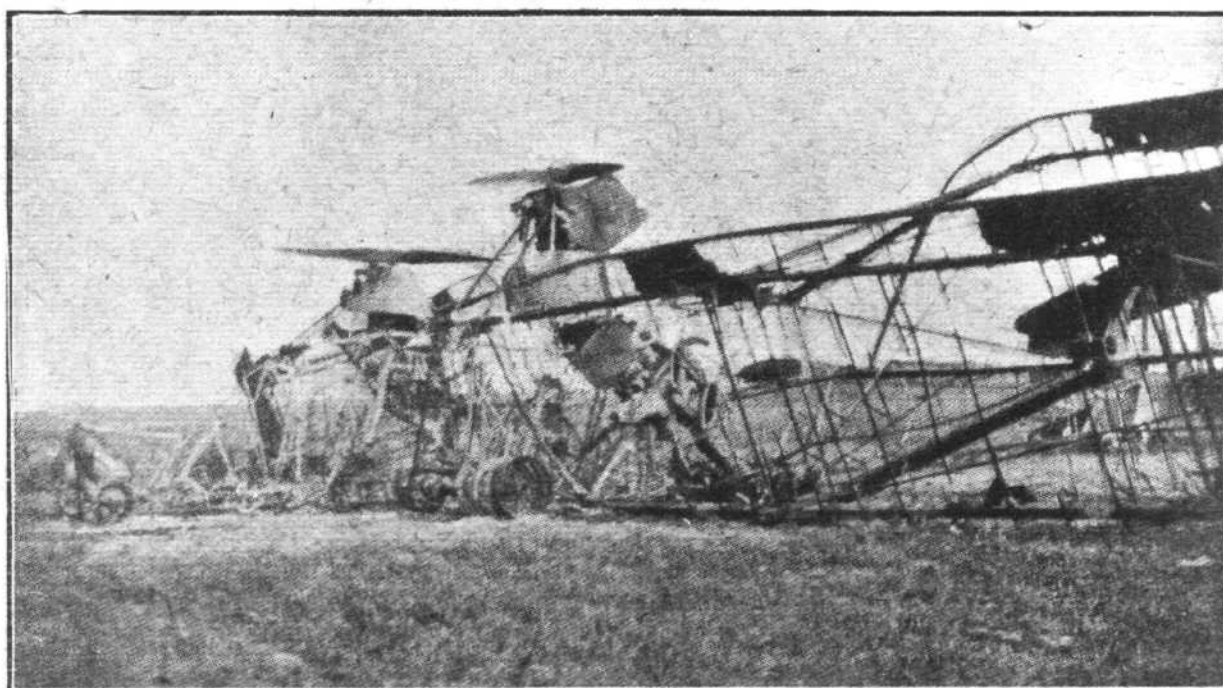


Fig. 58.—
General
view of
wreckage
of four-
engined
giant.

Wing Construction.

The spars are shown in Fig. 50, built up very elaborately in sections, and consisting of no less than seven sections of spruce, reinforced with multi-ply on each side, and finally carefully bound with doped fabric.

The spars of the lower wings are continuous, that is to say, they run right across the centre section of the *fuselage*, to the *longerons* of which they are secured, contrary to the usual practice, in which special compression members, form-

ing part of the *fuselage* construction, are employed. The wing surface, both upper and lower, is divided into three sections of which the middle section extends to the engine mountings on each side. The spars in this section are both at right angles to the axis of the *fuselage*. At each side of the middle section the leading edge of the wings is boldly swept back as well as tapered. The rear spars of the wings, together with those of the centre section, form a straight line from wing-tip to wing-tip, but the front spars are swept back.

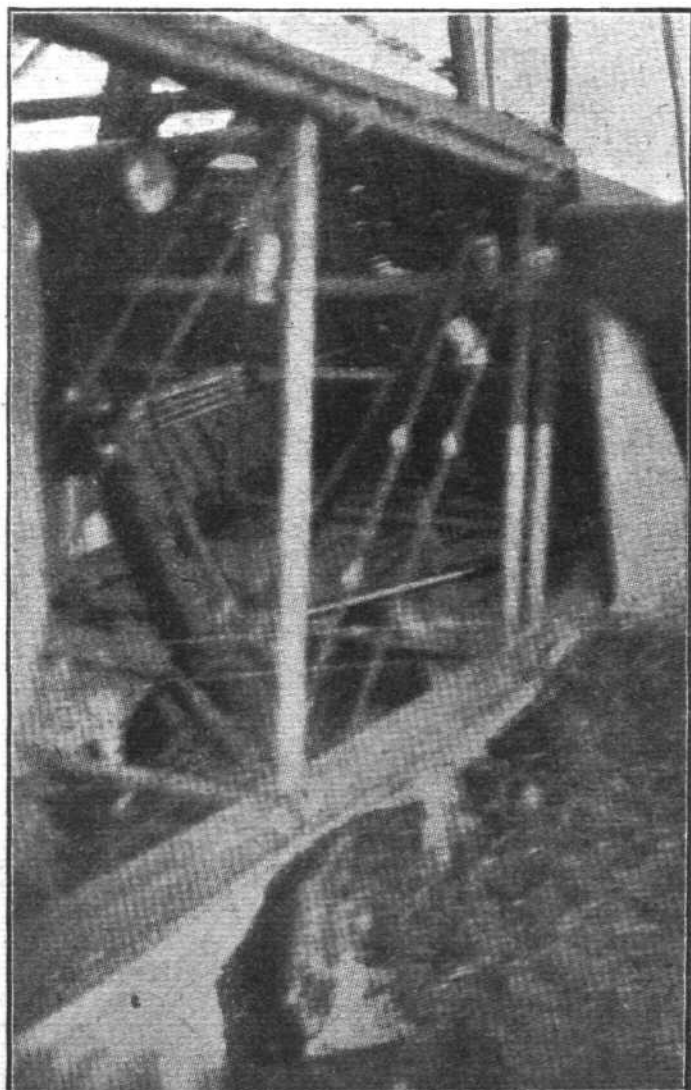


Fig. 59.—Rear end of *fuselage* and tail-skid of four-engined giant.

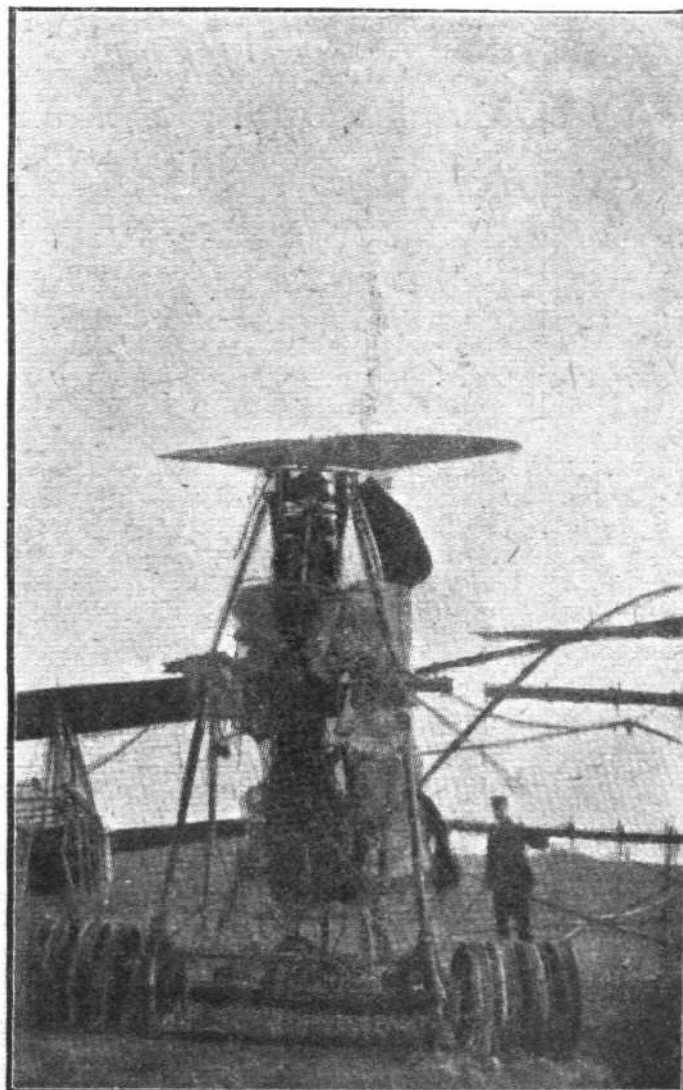


Fig. 60.
Power plant of four-engined giant.

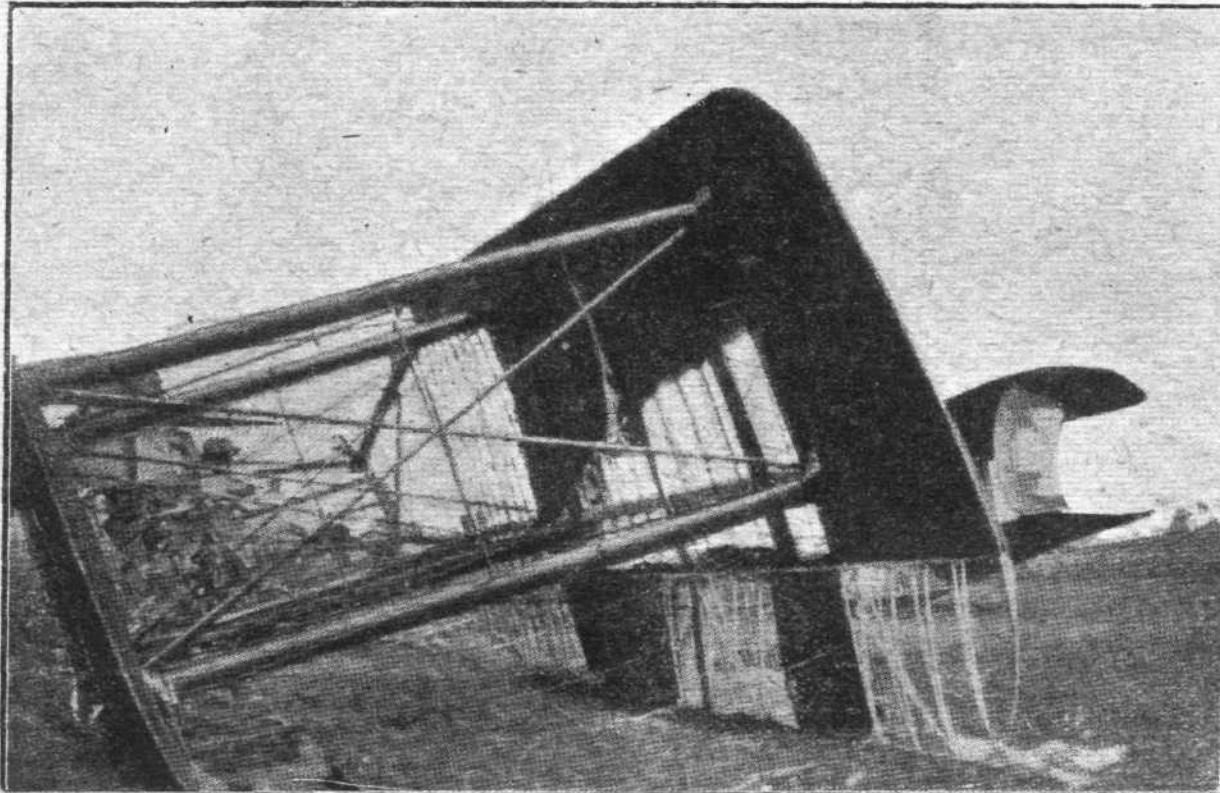


Fig. 61.—Main planes and ailerons of four-engined giant.

The ribs, of which a detail drawing is given in Fig. 51, are built up, and of girder form.

Between the leading edge and the leading spar, numerous extra ribs occur in addition to the main ribs. Internal bracing against drag takes the form of steel tubular compression members and steel cables, the former being placed at a point coincident with the attachment of each interplane strut. An additional bracing is installed, of which the compression member consists of a double rib placed half-way between the struts. In each case the bracing wires pass obliquely right through the spars.

The ribs are mounted parallel to the line of flight.

The disposal of the spars is as follows:—

Top Plane.—

Leading edge to centre of leading spar	1 ft. 9½ ins.
Distance between centres of spars ..	5 ft. 7½ ins.
Trailing edge to centre of rear main spar	5 ft.

Bottom Plane.—

Leading edge to centre of leading spar	1 ft. 7½ in.
Distances between centres of main spars	5 ft. 1 in.
Trailing edge to centre of rear main spar	5 ft. (approx.).

The trailing edge of this aeroplane was too badly damaged to permit of this measurement being given accurately.

Between the interplane struts the rear spars are thinned down in width, but their depth remains practically constant from root to tip. Such tapering as exists is so arranged as to promote a decided wash-out of the angle of incidence near the tip. This is done by tapering the front spar on its upper edge, and the rear spar on its lower edge.

Ailerons

These are on the top planes only, and are provided with a framework of steel tubing. They are not balanced, and the controls are led in the usual manner through the bottom plane from the aileron lever.

The span of each aileron is 22 ft. 5 ins., and the chord 3 ft. 4 ins.

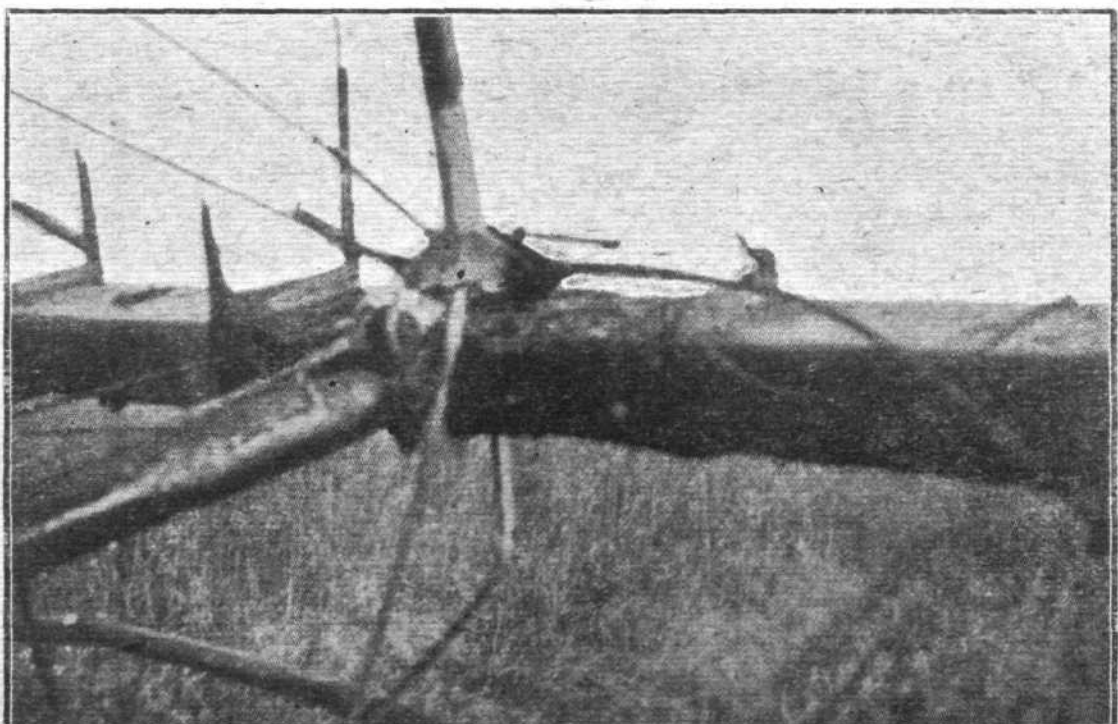
Inter-plane Struts

These are of large-diameter steel tube, covered in with a streamline fairing consisting of three-ply mounted on a light rib-work of wood.

Bracing

The attachment of the bracing cables to the spars is somewhat similar to the bracing of the Fokker fuselage; that is

Fig. 62.—Attachment of struts and compression tube on four-engined giant.



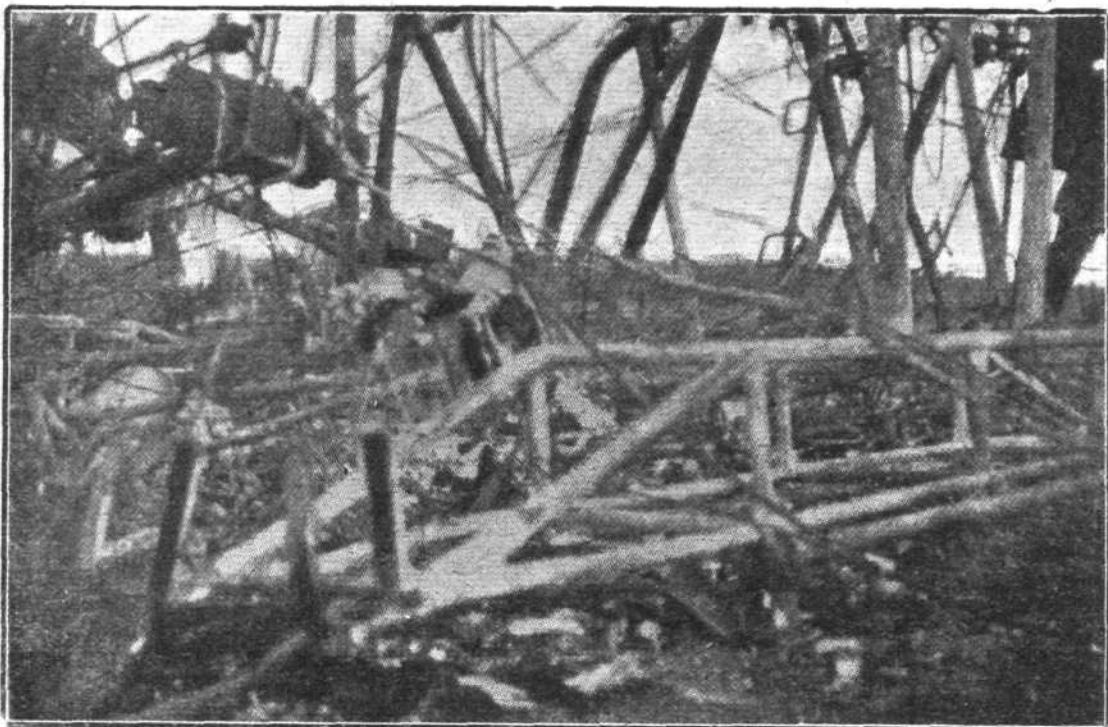


Fig. 63.—Bomb carrier of four-engined giant.

to say, the wires, instead of being anchored at each end to an eyebolt, are double, and are looped round the spar, to which is fixed a grooved channel-piece for the reception of the cable. It is difficult to see that any advantage is gained by this arrangement.

Tail Unit

A biplane tail, somewhat similar to that of the Handley-Page, is fitted. The fixed tail planes, the angle of incidence of which can be adjusted through small limits, are of wooden construction, and have the following dimensions :—

Span each side of fuselage	..	..	12 ft. 4 ins.
Chord (average)	..	..	4 ft. 10 ins.
Gap	..	..	6 ft. 9½ ins.

Elevators

These are fitted to both the top and bottom tail planes, and are of aluminium construction, the ribs, being of girder form, somewhat similar in construction to the ribs of the main planes. The elevators are not balanced ; the top and bottom elevators are fitted with independent control levers, but are presumably operated together from the control stick. Their dimensions are as follows :—

Span	..	..	..	..	28 ft. 6 ins.
Chord at tip	..	..	..	..	2 ft. 4 ins.
Chord at centre	..	..	..	..	1 ft. 6 ins.

Fins

There are three fins ; two outer ones forming interplane struts, and an inner central one of triangular shape.

Rudders

The framework of these organs is built up of aluminium in the manner set forth in detail in Fig. 52. This also shows the quadrant at the foot of the rudder posts by means of which they are operated ; each rudder post is fitted with ball bearings, both top and bottom.

Undercarriage

Beneath each engine section is an undercarriage consisting of a massive axle fitted with four wheels at each end. This axle is attached by india-rubber shock absorbers to the tubular steel V-struts which form extensions of the engine bearer struts. A third undercarriage is mounted under the forward part of the fuselage, and consists of an axle with one pair of wheels.

Armament

Only two gun mountings were found in the wreckage ; they were fitted to a revolving turret in the gunner's cockpit. The mountings are of the fork type, and are situated on opposite sides of the circle. No arrangements for firing under the tail were found, nor was there evidence of a forward gun mounting.

Bomb Gear

Two steel tubular frameworks are fitted, one on either side of the fuselage. They are apparently adapted to carry very large bombs, probably of 1,000 kg. each. The release gear appears to be similar to that used on the Friedrichshafen, and already reported upon.

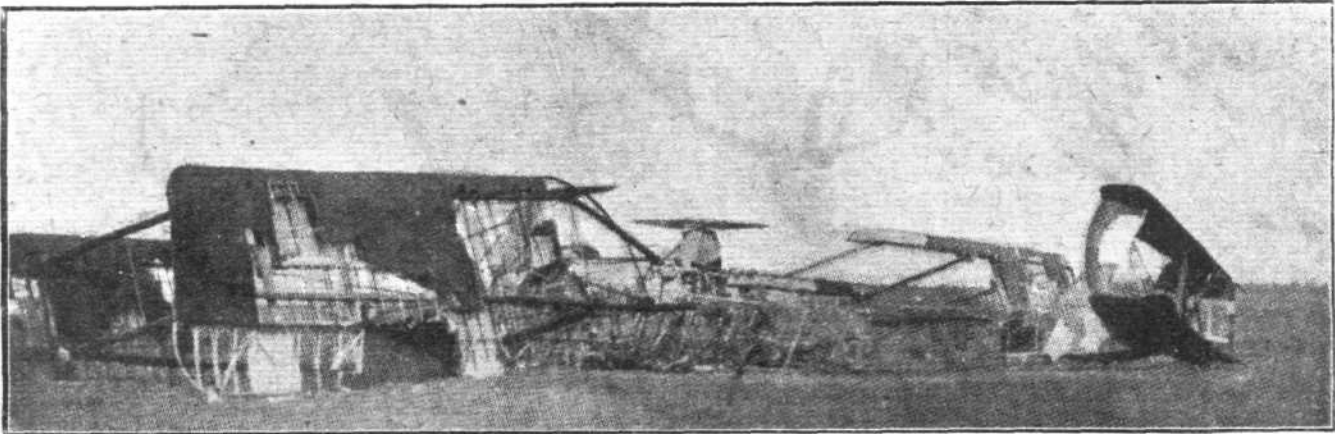


Fig. 64.—General view of wreckage of four-engined giant.

German Cruiser's Cargo of Aeroplanes

A LARGE German cruiser which ran aground on November 13th outside Limhamn, was said to have a great number of aeroplanes on board.

Flying Home to Germany

THE inhabitants of Eysden saw a remarkable sight on the afternoon of November 12th, when a batch of 50 German aeroplanes flew over on their way back to Germany from the Front,

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated on Active Service, and for the Widows and Dependants of those who are killed.

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Subscriptions

	£	s.	d.
Total subscriptions received to Nov. 19th, 1918	13,899	5	6
Employés of Messrs. Short Bros., Rochester ..	3	0	5
Proceeds of a Concert given by the Royal Air Force Orchestra, Calshot	16	12	0
Total, November 26th, 1918.. ..	13,918	17	11

Offices: THE ROYAL AERO CLUB,

3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

BOXING AND THE R.A.F.: A GENEROUS OFFER FROM COL. SIR CHARLES WAKEFIELD

THE importance of physical training is certainly fully recognised in the Royal Air Force, and has been properly organised on a very large scale. Among the various sports boxing occupies a foremost place, careful observation having shown its extreme value in the development of those qualities which go to the making of the ideal pilot.

The movement has now received encouragement of a very practical nature from Sir Charles C. Wakefield, Bart., who has been an early exponent of the pugilistic art, and whose public-spirited support of aviation is well-known. He has made a most generous offer of trophies and medals for boxing competitions among the officers and men of the Royal Air Force, and it has been gratefully accepted by Major-General Brancker, Master-General of Personnel, on behalf of the Air Council. It is one which will certainly stimulate a great deal of interest throughout the whole Service, as well as in boxing circles generally.

The scheme in outline is as follows: Sir Charles offers two challenge trophies, one for the officers and cadets of the R.A.F. and one for warrant officers, N.C.Os. and men, to be competed for annually. These trophies, which will be of the actual value of 50 guineas each, will be awarded to the team or unit securing the greatest number of aggregate points in the heavy, light heavy, middle, welter, light feather, bantam, and fly weight classes. There will also be two smaller replicas of these trophies, of the value of 10 guineas each, given to the winning teams and becoming their absolute property, while valuable gold medals will be awarded to each of the eight individual winners and silver medals to the eight runners-up.

The whole competition will be carried out under the supervision and organisation of the R.A.F., and we understand an

interesting announcement may be made shortly as to the arrangements for the finals, which it is proposed to hold in public in London. This splendid offer should meet with instant success, and Sir Charles' sporting spirit will be highly appreciated throughout aviation circles. The various eliminating contests held by each unit throughout the country will help to create a useful *esprit de corps* among the men which will be beneficial to their military training.

Sir Charles Wakefield is very anxious that these trophies and medals should be worthy of the occasion and unique in style, and he therefore authorises us to announce that he invites designs to be submitted. For the best suggestion for a trophy he offers a first prize of 10 guineas, and for the second prize 5 guineas. The design should be one specially appropriate to aviation and also have some bearing on athletic training, and of course must be well adapted for reproduction in model form.

A further first prize of 5 guineas is offered for the best design for the medals, and a second prize of 3 guineas. These designs should be addressed to Sir Charles C. Wakefield, Bart., c/o "FLIGHT," 36, Great Queen St., W.C.2, the last day for receiving them being January 31st next. They will be considered and prizes awarded by a small committee of well-known gentlemen whose names will be announced shortly.

There is plenty of artistic talent in the R.A.F., and it is to be hoped the winning designs will be evolved by members of this Force. There is scope for some really original ideas here, and the successful artists will have, in addition to the monetary reward, the satisfaction of having created something of a permanent nature which will occupy a prominent place in more than one Air Station Headquarters.

The W.R.A.F. to Stay

It appears that, while nothing definite has yet been settled with regard to the future of the W.R.A.F., there is every likelihood that the service will become a permanent one. We understand that the members are being circularised to discover their wishes in the matter of remaining in the force. Up to the present, no demobilisation has taken place, but those women who are married and whose husbands are home on leave are being given leave and when demobilisation takes place, the soldiers' wives will be the first to be disbanded. The force, of which Mrs. Gwynne-Vaughan is commandant, at present numbers 23,000 women, of whom 6,000 were taken over from the Q.M.A.A.C. and 2,000 from the W.R.N.S.

16,000 Pilots in France

It was announced last week that the Aero Club of France had issued its 16,000th pilot's certificate, the first of which was issued on October 7th, 1909—nine years ago. During the War the Aero Club of France, acting under the authority

of the Minister of Public Works, has continued to issue the certificates, and by agreement with the Minister of War and the Under-Secretary for Aeronautics every student-pilot qualifying for a military certificate was also deemed to have qualified for the Aero Club Certificate.

Captain Aston, R.A.F., a Parliamentary Candidate

FOLLOWING the announcement with regard to Col. J. T. C. Moore-Brabazon's (R.A.F.) candidature for Parliamentary honours, comes word of the formal adoption by the North Paddington National Party of Capt. W. G. Aston, R.A.F., as their candidate. Capt. Aston's policy will be to support Mr. Lloyd George as leader of the new Government to inaugurate the reconstruction reforms. With his knowledge of practical aeronautics Capt. Aston should be an invaluable critic of all matters pertaining to the future of aviation as they may come before the House of Commons for discussion. In fact we may look forward to some useful work from Capt. Aston, although we hope it will not be in the direction of the perpetuation of a bureaucratic control of the aviation industry.

THE ROLL OF HONOUR

When an Officer is seconded from the Army, his unit is shown in brackets.]

Published November 19th

Killed
Duncan, Sec. Lieut. T. W.
Flowers, Capt. H. F.
Died
Courthope, Capt. W. G.
Jeppe, Lieut. F. A.
Mumford, Sec. Lieut. L. R.
Wounded
Fyson, Lieut. R. C.
Hamley, Lieut. N. H.
Hursthouse, Capt. L. F.
Missing
Bullough, Sec. Lieut. J.
Dixon, Sec. Lieut. H. G.
Dobeson, Lieut. R. G.
Lightbody, Sec. Lieut. J. D.
Paget, Sec. Lieut. A.
Price, Sec. Lieut. O.

Previously Missing, now reported Prisoners
Bowater, Capt. A. V.
Cairns, Sec. Lieut. W. T. J.

Chisholm, Capt. J. P.

Published November 20th

Killed
Birkett, Sec. Lieut. H.
Camm, Sec. Lieut. P.
Cole, Sec. Lieut. W. T.
Davidson, Sec. Lieut. R. W.
Died of Wounds
Ward, Sec. Lieut. H. B.
Died
Harvey, Lieut. R. W.
Drowned
Domegan, Lieut. C. P.

Cadets Killed
Archibald, W. A.
Binnie, A. D.
Eastwood, R. G.
Wounded
Andrews, Sec. Lieut. J.
Baldwin, Sec. Lieut. H.
Berry, Sec. Lieut. A.
Browne, Capt. A. D. C.

Previously Missing, now reported Wounded and Prisoner
Bird, Lieut. B. A., R.A.F.
Missing
Berry, Sec. Lieut. H. J.
Bowles, Lieut. F. S.
Curtis, Lieut. H. J.

Previously Missing, now reported Prisoners
Darby, Sec. Lieut. E.
Powell, Capt. F. G.

Published November 22nd

Killed
Beresford, Sec. Lieut. J. H. F.
Brown, Lieut. J. S.
Griffiths, Sec. Lieut. R. H.

Previously Missing, now reported Killed
Mackenzie, Lieut. G. O.

Died of Wounds
Gill, Capt. K. C.

Died
Buchanan, Lieut. A. N.

Wounded
Brooke, Sec. Lieut. T. G.
Bull, Sec. Lieut. E. R.
Cooper, Lieut.-Col. R. A., D.S.O.
Hodgson, Capt. F. H.

Previously Missing, now reported Wounded and Prisoner
Coward, Lieut. S. R.

Missing
Brouncker, Sec. Lieut. C. C.
Carey, Lieut. J. G.
Cartwright, Sec. Lieut. P.
Dawson, Sec. Lieut. E.
Dee, Sec. Lieut. D. M.
Hamlet, Sec. Lieut. H. A.

Previously Missing, now reported Prisoners
Burnham, Lieut. M. E.
Gondre, Sec. Lieut. J.

Published November 23rd

Killed
Christiani, Sec. Lieut. F. R.
Clarke, Lieut. R. A. R., M.C.
Hall, Sec. Lieut. S.
Phillips, Lieut. T.

Previously Missing, now reported Killed
Morgan, Lieut. B.
Whittaker, Sec. Lieut. F. C.

Died
Quigley, Capt. F. C., M.C., D.S.O.
Wright, Lieut. L. R.

Wounded
Osborne, Sec. Lieut. S. J.
Shutes, Lieut. R. F.

Missing
Radley, Lieut. J. E.
Reid, Lieut. J.
Shackleton, Sec. Lieut. W.
Sissing, Sec. Lieut. A. E.
Walford, Capt. W. G.
Wiener, Lieut. L. de V.

Previously Missing, now reported Prisoners
Gillett, Sec. Lieut. W. H. C.
Johnson, Sec. Lieut. W. J.

Interned
Derwin, Lieut. E. C. E.
Hale, Sec. Lieut. P. R.
Moir, Sec. Lieut. G. A.

Previously Missing, now reported Killed
Speer, J. R.
Wood, J.

Previously Missing, now reported Killed
Cockburn, Sec. Lieut. J.
Corker, Lieut. A. F., D.F.C.
Nutter, Sec. Lieut. V.

Previously Missing, now reported Killed
Harcourt-Vernon, Capt. A. A.
Gaze, Lieut. I. O.
Newstead, Sec. Lieut. C. W.

Previously Missing, now reported Killed
Richardson, Sec. Lieut. J. B.
Smith, Capt. A. F.

Previously Missing, now reported Killed
Harris, Capt. T. W. S.
Jackson, Sec. Lieut. F. J.

Previously Missing, now reported Killed
Osborne, Sec. Lieut. D. S.

Previously Missing, now reported Killed
Ferguson, Lieut. J. F.

Previously Missing, now reported Killed
Lane, Sec. Lieut. R. V.
Parsons, Sec. Lieut. H.
Pemberton, Sec. Lieut. F. R.

Previously Missing, now reported Killed
Macdonald, Sec. Lieut. C. C.
McDonald, Sec. Lieut. D. C.
Macnamara, Sec. Lieut. J. F.
Potts, Sec. Lieut. W. J.
Straw, Lieut. L. L. K.

Previously Missing, now reported Killed
Pouckot, Sec. Lieut. J. A.
Walker, Capt. W., D.F.C.

Died of Wounds
Warman, Sec. Lieut. W. A.

Cadets Killed
Bailey, H. C.
Currie, J. E.
Dumpson, A. J.

Wounded
Gargett, Lieut. H. S.
Hinksman, Sec. Lieut. F. C.
McCarthy, Lieut. W. F.
Mitchell, Sec. Lieut. H. W.

Missing
Macaulay, Sec. Lieut. A. C.
O'Donoghue, Lieut. J.
Pugh, Sec. Lieut. J.

Previously Missing, now reported Killed
Birchard, Sec. Lieut. G. F.
Brown, Lieut. J. M., D.F.C.
Clemens, Lieut. W. E.
Douglas, Capt. B.
Greene, Capt. J. E.

Previously Missing, now reported Killed
Barlow, Capt. R. T.
Boulton, Sec. Lieut. N. S.
Bunbury, Capt. T. St. P.

Died of Wounds
Goodwill, Lieut. E. A.
Kibby, Sec. Lieut. H. C.

Died
Hardy, Sec. Lieut. J.
Slocombe, Lieut. D. W.

Wounded
Chalmers, Sec. Lieut. C. W. S.
Cook, Sec. Lieut. C. R.
Hardwidge, Sec. Lieut. R. E.

Missing
Dowler, Sec. Lieut. G. E.
Hemingway, Sec. Lieut. A.
Howden, Sec. Lieut. W. A.
Johnson, Lieut. E. H.
McHardy, Sec. Lieut. A. W.
McKay, Capt. D. R. G.
Pugh, Lieut. J. E.
Richardson, Lieut. G. T.

Previously Missing, now reported Prisoners
Adams, Sec. Lieut. N. F.
Brie, Lieut. R. A. C.
Cooke, Lieut. P. B.
Home-Hay, Capt. J. B., M.C., D.F.C.
Jenner, Lieut. P. C.
Lindley, Capt. A.

Previously Missing, now reported Prisoners
Lloyd, Lieut. C. B. E.
Naylor, Lieut. C. B.
Sparkes, Lieut. C. P.
Sproule, Lieut. E. R. L.
Thomson, Lieut. R. W. L.
Usher-Somers, Sec. Lieut. C. E.

Previously Missing, now reported Killed
Baldwin, Sec. Lieut. W.
Fox, Sec. Lieut. H. C.
Goodearle, Lieut. F. R.
Hill, Sec. Lieut. A. W.
Hill, Lieut. S.
Howells, Sec. Lieut. E. L.

Previously Missing, now reported Killed
Ely, Lieut. F. W.

Died of Wounds
Lloyd, Sec. Lieut. R. A. H.
Middleton, Sec. Lieut. A. S.
Reynolds, Lieut. C. E.

Died
Dalgleish, Sec. Lieut. N. J.
Fenton, Sec. Lieut. C. E.
Hill, Lieut. A. C. F.
Leslie, Lieut. G. B.
Parker, Lieut. F. H.

Cadets Killed
Critchley, G. E.
Crook, H. E.
Davis, C. W. J.

Previously Missing, now reported Wounded and Prisoners
Norris, Sec. Lieut. E. J.

Previously Missing, now reported Prisoners
Allan, Sec. Lieut. A. M.
Anderson, Lieut. G. F.
Armstrong, Sec. Lieut. R. H.
Bodley, Sec. Lieut. W. G. L.
Brandrick, Sec. Lieut. A.
Bucknall, Sec. Lieut. C. V. A.
Calrow, Lieut. R.
Caswell, Lieut. G. F. C.

Previously Missing, now reported Missing, believed Prisoner
Bennett, Lieut. H. J.

Previously Missing, now reported Missing, believed Prisoner
Heathcote, Lieut. L. W., Aust. F.C.
Lander, Lieut. T. E., M.C., High. L.I., attd. R.F.C.
Palmer, Lieut. C. V., Norf., attd. R.F.C.
Parkinson, Sec. Lieut. V. J., Aust. F.C.
Rutherford, Capt. D. W., Aust. F.C.
Smith, Sec. Lieut. L. H., Aust. F.C.
Welman, Lieut. J. B., R.F.A., attd. R.F.C.

Previously Missing, now reported Missing, believed Prisoner
Reveley, Lieut. P. T. A.

Previously Missing, now reported Missing, believed Prisoner
Dunlop, Sec. Lieut. G. B.
Edsted, Lieut. F.
Goodhugh, Sec. Lieut. P. H.
Jeffkins, Sec. Lieut. E. C.
Jenkins, Sec. Lieut. O. V.
Larrabee, Lieut. E. P.
Yates, Lieut. J. A.

Previously Missing, now reported Missing, believed Prisoner
Rennie, A. M.
Theobald, C. S.
Wilson, R. B.

Previously Missing, now reported Missing, believed Prisoner
MacKenzie, Lieut. D. A.
MacLean, Lieut. R. S. G.
Mather, Lieut. W. A.
Murray, Sec. Lieut. W. L.
Stephen, Sec. Lieut. J. D.

Previously Missing, now reported Missing, believed Prisoner
Vande-Water, Sec. Lieut. M. G.
Wainwright, Sec. Lieut. C. E.
Wood, Sec. Lieut. R.

Previously Missing, now reported Missing, believed Prisoner
Ponting, Lieut. W.
Spong, Lieut. R.
Stansell, Sec. Lieut. L. B.
Williams, Lieut. P. E.

Previously Missing, now reported Missing, believed Prisoner
Foss, F. K.
Jennings, A. R.
Mossop, R.

Previously Missing, now reported Missing, believed Prisoner
Patey, Capt. H. A.

Previously Missing, now reported Missing, believed Prisoner
Townesley, Sec. Lieut. H. A.
Upfill, Lieut. T. H., M.C.
Walker, Sec. Lieut. J. C.

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Foss, F. K.
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Previously Missing, now reported Missing, believed Prisoner
MacKenzie, Lieut. D. A.
MacLean, Lieut. R. S. G.
Mather, Lieut. W. A.
Murray, Sec. Lieut. W. L.
Stephen, Sec. Lieut. J. D.

Back from Turkey

The following officers who were prisoners in Turkish hands have been released:—

Atkins, Capt. B. S., I.A. Inf., attd. R.F.C.
Floyer, Lieut. E. A., M.C., I.A.R.O., attd. R.F.C.
Hill, Lieut. C. W., R.F.C.

CIVIL AERIAL TRANSPORT

ALTHOUGH the report of the Civil Aerial Transport Committee, which was laid before the Air Council nearly six months ago, has been presented, it apparently will not be published until Parliament meets again in the New Year. In the meantime, however, *The Times* has been enabled to give an outline of the report, and as this bears the impress of having been written by someone acquainted with the facts, we reproduce it below:—

"The original reference was to consider:—

"(1) The steps which should be taken with a view to the development and regulation after the war of aviation for civil and commercial purposes, from a domestic, an Imperial, and an international standpoint.

"(2) The extent to which it will be possible to utilise for the above purpose the trained personnel of the aircraft which the conclusion of peace may leave surplus to the requirements of the Naval and Military Air Services of the United Kingdom and Oversea Dominions.

"The Committee, which has undergone some changes since its appointment in May last year, was a large and representative one. It included such experts as Sir Richard Glazebrook, F.R.S.; Mr. G. Holt Thomas, the builder of the De Havilland type of aeroplane; Mr. Claude Johnson, the managing director of Rolls-Royce, Ltd.; Mr. F. W. Lanchester; Mr. T. Sopwith, builder of the well-known fighting scouts; Lieut.-Col. O'Gorman, Superintendent of the Royal Aircraft Factory from 1909 till 1916; Mr. J. D. Siddeley, engine builder; Major-Gen. Ruck, C.B., ex-chairman of the Aeronautical Society of Great Britain; Mr. H. G. Wells, Mr. Butler Aspinall, K.C., Mr. Balfour Browne, K.C., Brig-Gen. Branker, R.F.C., Capt. Vyvyan, R.N.A.S., Col. J. W. Pringle (Board of Trade), Sir Mackenzie Chalmers (Home Office), Sir Laurence Guillemard (Board of Customs and Excise), Mr. G. E. P. Murray (Post Office), Mr. G. E. A. Grindle (Colonial Office), the Duke of Atholl, Lord Sydenham, Lord Montagu of Beaulieu, Lord Drogheda (Foreign Office), Mr. Joynson-Hicks, M.P., Mr. Tyson Wilson, M.P., Mr. A. E. Berriman, Mr. G. B. Cockburn, Mr. H. White-Smith, and representatives of all the self-governing Dominions. Lord Northcliffe, who was the original chairman, had time only to preside at the first meeting before he left for the United States as head of the British War Mission. Major Baird, M.P., was the deputy-chairman.

"It was soon found that the Committee was far too large, and accordingly it divided into several special committees, the most important perhaps being No. 1, under the chairmanship of Lord Sydenham, whose task was to advise on policy and necessary legislation, with special reference to:—

"(1) The attitude to be adopted by the State with regard to national sovereignty in the air, and international questions connected with aerial transport.

"(2) The question of State ownership (if any) or of necessary State control and regulation of Customs, quarantine, and aliens.

"(3) Necessary amendment of the common and statute law as to the air covering private property, and as to compulsory purchase of land for aerodromes and landing grounds.

"(4) The principles of liability for damage caused by or to aircraft.

"These questions raised at once the initial difficulty of the sovereignty of the air, that is to say, whether the old doctrine that the owner of a piece of land possessed rights *usque ad coelum* existed up to the present moment and should exist for all time. This question had been discussed as an international one when a Convention sat in Paris in order to deal with the rights of international aviation, and that Convention failed largely over this question, the Germans holding that it was idle to restrict the right of flying over private lands and claiming 'the freedom of the air' in a sense which would allow of machines flying, for example, over Portsmouth Harbour. The British delegates, on the contrary, having in view, perhaps, what afterwards occurred, took the contrary view, and held that there must be sovereign rights in any State to control the passage and use of its own air. The Committee came to the conclusion that in any legislation there must be an assertion of the 'sovereignty and rightful jurisdiction of the Crown over the air superincumbent on all parts of His Majesty's Dominions and the territorial waters adjacent thereto.' They added that, in their opinion, the ordinary three-mile limit of territorial waters would not be sufficient for what may be called 'territorial air,' and they redrafted the original International Convention for submission to the Foreign Office, and, it is hoped, for the consideration of another conference to be called shortly. It may be recalled that a few days before Parliament rose Mr. Joynson-Hicks asked the Government

whether they were taking any steps to call such a conference, and the Foreign Office replied that they hoped shortly to be able to make a statement on the subject. It is regarded as of the highest importance that this conference should be called immediately. At present there are no regulations governing flying on the Continent or foreign flying here. Methods of identification, of inspection of passports, of Customs, the provision of landing stages, and the thousand and one matters which require consideration and settlement in regard to the new method of transport are still unsettled, and, whether or not Germany takes part in the conference, it is essential, in order that the change from military to civil aviation should not be delayed and complicated, that the conference should get to work at once.

"Committee No. 1 also drafted the clauses of an Aerial Navigation Bill dealing with such points as the qualifications for owning aircraft, registration, certificates of air-worthiness, certificates of officers, regulations dealing with collisions, identifications, papers, signals, customs, and the Post Office.

"The other important question which came before the Committee was the ownership of air by the individual landowner, and the Committee came to the conclusion that no action for trespass should lie, except for material damage, but that a right of action for trespass should include one for injury caused by the assembly of persons on the landing or ascent of aircraft elsewhere than at authorised aerodromes, and in an action for trespass the obligation on the aviator should be absolute, it not being necessary to prove negligence against him. Under the present law grave damage may be caused to a man or his property by a moving vehicle without any right of redress. If, for instance, a man is run over in the street by a motor-omnibus he cannot obtain damages unless he proves that the driver was in some way negligent, but the Committee felt that in the case of a machine falling from the skies killing or injuring either the landowner or, say, his poultry, it would be impossible to prove negligence on the part of the airman, and that accordingly in such a case the actual machine causing the damage should be responsible, even though the fall might be caused by collision with another machine whose pilot was the guilty party.

"The second Special Committee dealt with the scientific and technical side of aeronautics with a view to ascertaining what could be done in commercial transport by the then existing machines, and they took as their standards four machines—the Handley-Page, the De Havilland, the R.E.8, and the Sopwith 'Pup.' The two aeroplanes which the war has shown to be suitable for commercial aviation are the big Handley-Page, one of the largest of which recently flew over London with 40 passengers, and the De Havilland type of large bomber. The De H. 10, which has been evolved from the De H. 4 since the Committee sat, is the machine which Mr. Holt Thomas proposes to use in his flights from London to Paris.

"The Committee arrived at six definite conclusions about aeroplanes, as follows:—

"(1) That for commercial success speed is probably the most material factor.

"(2) That for commercial success the speed needed depends very largely on the conditions of competing methods. Between large centres connected by direct high speed railways, speeds of 100 miles per hour are desirable; but for linking places between which the railway service is slow or interrupted by sea crossings, lower speeds will be found commercially practicable.

"(3) That at present stages of about 500 miles would be the normal limit, but that it will be desirable from the commercial point of view that stages should be as long as possible.

"(4) That it is desirable as speedily as possible to develop the existing facilities for night flying, especially for the carriage of mails.

"(5) That heavy loading is necessary for commercial success, but since this will involve a high landing speed, development of land and air brakes is necessary.

"(6) That in view of certain disadvantages of high landing speed, efforts should be made to keep loading as low as possible consistently with securing a commercial rate of speed, and to provide for aerodromes and landing places possessing the best possible surfaces, and that it may well be hoped that future inventions and improvements in design will enable a lower landing speed to be attained without sacrifice of flying speed.

"The Committee also had to consider whether there was a possibility of unexpected inventions modifying the lines of present development, but they came to the conclusion that this was not so, and that while there would be considerable

development in the existing appliances for flying there was no prospect of more than quantitative modifications of existing conditions. The existing aeroplane will be improved. Such things as folding wings, already used in the Handley-Page machine, will, no doubt, be increased, and an all-round improvement in engines is still certain to come. A very great improvement has taken place, in fact, since the Committee sat, and the Liberty engine may, though it is not yet certain, revolutionise aerial navigation.

"The Committee felt that every effort should be made by State aid or State encouragement to widen the basis of fuel production and to prevent the great interests both of aerial navigation and of automobilism being dependent on fuel of any one kind, particularly if it comes from overseas. The importance of this point has been emphasised during the recent war, in which the civilian consumption of petrol has been so severely restricted. The Committee also considered at great length definite air routes, such as from London to Edinburgh, Glasgow, Dublin, the Riviera, Russia, and South Africa.

"The mere provision of aeroplanes is a small part of the question of commercial aviation. The provision of aerodromes and landing stages is urgently needed and without compulsory powers of purchase, of course, is more difficult. The whole question of landing grounds, in regard to which the military side of aviation has afforded ample experience, had to be considered, and the Committee concluded that landing grounds should—

"(1) Bear some reference to the direction of the main aerial routes;

"(2) Be sufficiently far from the centres of cities to be fairly clear of houses in the direction of flight;

"(3) Be unlikely to be shut in by buildings in the immediate future;

"(4) Be as far as possible clear of railways, telegraphs, trees, and other obstructions;

"(5) Be situated on ground as far as possible free from mist or fogs;

"(6) Be provided with adequate water supply, telephone connections, and good facilities for rail, tram, omnibus, and motor traffic with the different districts of the cities to be visited;

"(7) Be capable of expansion.

"The Second Committee also came to the conclusion that the use of aircraft would be advantageous:—

"(1) In the case of mails, by competing with the telegraph service, or by establishing a new type of express letter service;

"(2) In the case of passengers, by affording rapid transit over long distances, particularly where the journey includes a sea crossing; and

"(3) By enabling ordinary merchandise, commercial samples, etc., to be carried more rapidly than by any other means.

"The Committee, however, came to the conclusion that probably one of the first methods of employing aeroplanes for the transport of passengers might lie, not in a regular service, but in the occasional and increasing use of single machines for rapid journeys, and this appears to be the line upon which development may be expected to take place, as exemplified in Mr. Holt Thomas's scheme mentioned above.

"The third, fourth, and fifth special committees were of a more technical character. The third dealing with production throughout the Empire of the necessary types of aircraft for organised aerial services, the fourth with the possibility of setting up a model type of industrial organisation applicable to the whole of the labour employed in aircraft manufacture and transport; and the fifth with aeronautical inventions and experiments, research in regard to meteorology, and investigation of accidents.

"One question was discussed in several of the committees and in the Main Committee, which will have to be settled by Parliament—namely, whether commercial flying is to be undertaken as a big experiment in State Socialism, or whether it is to be entrusted to individual enterprise, supplemented, so far as landing stages are concerned, by the assistance of the existing military organisation or the exercise by the State of compulsory power of purchase. Some members of the Committee were obviously inclined to favour a State experiment, but Committee No. 1, presided over by Lord Sydenham, reported in favour of State encouragement of private enterprise, and against what may be called a State Socialistic experiment. It is claimed by many that the new industry should be as free from State control as possible. A private firm, it is urged, can properly risk its capital in exploiting a promising new invention or development, but a State department would be in the position of a trustee, would think twice or thrice before risking the necessary funds, and would be responsible to Parliament for its action. During the war the Air Council has admittedly made bold experiments, but it is pointed out that in doing so the Department has been untrammelled by Parliament, and has been free to incur an expense unthinkable in peace time."

THE AIR COUNCIL'S THANKS.

THE following announcement was received on Monday evening: "Now that the final submission of Germany by the surrender of her fleet and submarines has taken place, the Air Council desire to express their gratitude to all ranks of the Royal Air Force for their share in the long series of operations which have ended so triumphantly for British arms, and their deep admiration for the valour and devotion to duty which has been shown through all vicissitudes.

"In every theatre of war, by sea and by land, the assistance of units of the Royal Air Force has been a factor of ever-increasing importance in the operations of the Navy and Army; in these islands, also, the Home Defence Squadrons, under conditions of great difficulty and danger, have successfully met the menace of the enemy's attack by air on the civil population.

"In recent months the work of the Independent Air Force has had moral and material effects, which

have contributed powerfully to the disintegration of the enemy's capacity for resistance.

"These results are due to the brilliant and inspiring leadership, staff work, and organisation of the force, to the self-sacrifice and daring of pilots and observers, the unceasing care, under arduous conditions, of the ground personnel, the courage and devotion of flying instructors at home, and to the ingenuity and industry of all ranks in the equipment branches.

"To all these, as well as to all the members of the Women's Royal Air Force, the Air Council tender the expression of their warmest admiration and gratitude in a spirit of thankfulness for the great results which, from small beginnings, have been achieved by the Air Service, and with the hope and the confidence that, as aviation has shown itself to be so potent a factor in war, so it may also prove itself to be a beneficent influence in the peaceful development of civilisation.

Two S.B.A.C. Technical Committees

For the purpose of dealing with such technical matters as arise from time to time, the Society of British Aircraft Construction have set up two special technical committees as follows:—

Aircraft Technical Committee—Capt. G. de Havilland (Aircraft Manufacturing Co., Ltd.), Capt. F. S. Barnwell (British and Colonial Aeroplane Co., Ltd.), Messrs. H. P. Martin (Martinsyde, Ltd.), F. Handley Page (Handley Page, Ltd.), A. V. Roe (A.V. Roe and Co., Ltd.), T. O. M. Sopwith (Sopwith Aviation Co., Ltd.), E. C. Gordon England (Frederick Sage and Co., Ltd.), O. Short (Short Brothers), R. A. Bruce (Westland Aircraft Works, Petters, Ltd.), J. D. North (Boul-

ton and Paul, Ltd.), R. K. Pierson (Vickers, Ltd.), C. R. Fairey (Fairey Aviation Co., Ltd.), Lieut.-Col. M. O'Gorman (Aircraft Manufacturing Co., Ltd.).

Aircraft Engine Technical Committee—Messrs. A. J. Rowledge (D. Napier and Son, Ltd.), L. J. le Mesurier (Sir W. G. Armstrong, Whitworth and Co., Ltd.), F. R. Smith (Sidleley-Deasy Motor Car Co., Ltd.), A. H. R. Fedden (Cosmos Engineering Co., Ltd.), G. E. Bradshaw (A.B.C. Motors, Ltd.), Lieut.-Col. Mervyn O'Gorman (Aircraft Manufacturing Co., Ltd.), L. Coatalen (Sunbeam Motor Car Co., Ltd.), J. D. Pitt (Wolseley Motors, Ltd.), C. C. Elliott (Rolls-Royce, Ltd.), Lieut. A. E. Bush (Daimler Co., Ltd.), A. V. Davidge (Austin Motor Co., Ltd.).

THE TWO FUTURES FOR FLIGHT

IS AVIATION TO BECOME UTTERLY THE TOOL OF BUREAUCRACY?

By H. MASSAC BUIST

A FIRST effect of the cessation of hostilities was that some folk in the aviation world took the line that there can be no lessening of the scale of aircraft manufacturing orders for naval and military service without disaster to the new movement. The fact, of course, is far otherwise. The final end of aviation has never been military. That has been merely incidental even as the occasions for it are intermittent by contrast with the needs for commercial aviation being constant. Individual nations, far less the world, are not at war for certainly more than one day in five of the life of the average citizen. True, a campaign can cost for one day a sum of wealth which cannot be created in five, ten or even twenty days. Such is the case of this lately concluded world war. Even so, however, the fact is not altered that the uses for all forms of aerial navigation must be collectively vastly greater in peace than they are in time of war. Those pessimists who talk as though no aviation enterprise in peace time can obtain on the scale of our aircraft enterprise in war certainly overlook the exceedingly paltry scale on which we have exploited military aerial navigation to date, despite the extraordinarily important results achieved by the evolution of the Third Service.

The Aerial Arm has not been given a full trial yet

THUS, does the man in the street realise that at the time the Germans began their big offensive in the West last spring the British had something under 4,000 machines in total in France, and that the French had round about 4,000; in other words, that on the Western front at that time the Allies collectively probably enjoyed the superiority in quantity of equipment in this arm over the Germans with less than 8,000 machines between them. Again, is it realised that as recently as August last, by which time, of course, the Allies' equipment had become on a greater scale, a record was achieved to that period by the British having 1,000 machines over the enemy lines in the course of a single day? When one has in mind the scale of this enterprise in relation to the magnitude of all arms engaged on both sides, it is plain that, mighty as has been the part aviation has played in the fortunes of the war, nevertheless the new arm has been able to give a taste merely of its quality by reason of the utterly insignificant proportions on which it was tried in relation to the total forces engaged. We have learnt this only, that in any future war air forces will count beyond everything. Assuming equal quality, the side that has the greater equipment can afford to dispense with 50 infantrymen at least for every aircraft it puts into the operations. It is a question, therefore, only of having aircraft by tens of thousands to dispense with the need for infantrymen by the hundred thousands. Never can there be a world war as protracted as this one. That is assured alike on grounds of cost and because by reason of the stage of development on which we are just free to embark. The world will be in a position to equip itself properly with aircraft hereafter.

True, American aviation enterprise is at last coming along on a great scale. The American industry has been brought quite up-to-date, enjoying all the fruits of all the Allies' as well as of the enemies' costly experience in Europe; but much of that trans-Atlantic industry, like our own, was improvised. America has turned over to 100 per cent. war work only this autumn. Consequently many of the firms that were scheduled to produce aircraft equipment on a vast scale had scarcely got going, far less gained all the useful experience. Now they will return to their ordinary peace time manufactures. Hence the work of changing over will be much more rapid in the United States than it can be in Europe. Remember, to have given herself as utterly to winning the war as we have done, America would have had to have an army of more than 10 million and to have spent £20,000,000 a day for four years. Of course, the aircraft industry in the United States has not had the variety of experience in production we have gained in Europe, for one thing by reason of the concentration on a single type of motor, the Liberty; but it has the advantage of having been brought quite up-to-date by the Royal or shorthand route of skipping the tedious and costly intermediate stages. The United States aircraft movement and industry can be safely entrusted to look after themselves; the more so in that within the borders of the States, to say nothing of South America, there is both money in plenty and the need for building aircraft wholesale for civilian uses. Therefore, one of the obvious first steps on the capitulation of Germany is the cancellation of orders for tens of thousands

of Liberty engines, and so on, placed for the British Flying Service in 1919.

Taking Stock of the Situation

In Europe, however, we have far greater aeronautical problems. The outlook may be all the more interesting; certainly the immediate prospect is not wholly serene, though doubtless it can be made so by resolute, timely and united action. Here we have populations more closely concentrated, so that the proposition of aerial passenger services between certain European centres can be exploited to a greater extent as a self supporting undertaking than in the case of the United States of America, which has twice the population of these islands, but that is spread over an area larger than the continent of Europe; whereas despite the frightful slaughter of the war, the total population of Europe is many times that of the United States of America. Let us, therefore, take stock of the situation from various aspects.

In this country we have what may be styled a temporary as well as a permanent aircraft industry. The temporary one need cause us no concern in that the call for it lapses automatically with the conclusion of hostilities. The units composing that section return eagerly to their normal activities, the demand for which is increased in measure with the period during which they have been in abeyance.

Our permanent aircraft industry is that which, for the most part, was in being before hostilities were declared; but which has developed amazingly since August, 1914. It has been divisible into originators in this country and reproducers of foreign designs in this country. Without exception, I think every originating firm in time of peace has remained so throughout the campaign, and will occupy that position in the industry hereafter. By contrast, sundry of the firms which before the war were mere reproducers of foreign designs under licence developed designs of their own during the campaign. Certainly, under peace conditions this latter category will continue its more recent phase of work.

How we are situated amongst the Nations

We must not expect, however, that the time will ever come when the design of every part of all aircraft produced in these islands will be evolved here. Obviously, we cannot enjoy the advantages of the world's aircraft development if we do not reproduce here such schemes of cardinal importance as have been evolved exclusively abroad, even as, when we evolve something in the nature of a master patent, such ideas will have to be reproduced under licence in other countries besides these islands.

All this is without prejudice to the fact that, in the main, Britain will develop distinctly British aircraft schemes, as France will evolve French ones, Italy Italian ones, and our enemy German ones. This international competition is the more important in face of the great change that has come over the world since last we were at peace. We were the ship builders of the world. To the end of the campaign in that connection we remained in a predominant position; because the colossal shipbuilding industries that have been brought into being in the United States of America, and elsewhere, as a consequence of the grave losses of tonnage and of the excessive demands for it occasioned by the campaign, have not yet achieved the peak of their output curve. Neither have we; but in place of our being such great shipbuilders that, by comparison, the output of other nations was relatively of very little count, we shall find ourselves hereafter merely one great shipbuilding nation among many, and that without prejudice to the fact that our output of tonnage for years to come will eclipse all pre-war achievements. Neither the United States, nor Japan, will ever look back on the shipbuilding schemes on which they are engaged. The scale of them will not decline.

But during this war the first thing aircraft in action did in the way of preparing a post-war situation was to educate the masses to the sheer practicability and handiness of aerial navigation. When they hear of the Chancellor of the Exchequer economising time by journeying from Hendon to Paris by air, and know our generals travel between the Front and London that way, too; when they have seen enemy aircraft attack London not once, but repeatedly, despite brilliant efforts made to render such enterprise impossible, it has been borne in on the people throughout the length and breadth of the land that aerial navigation has not merely reached the stage of being a practical mode of travel; aircraft are, besides, in a high percentage of cases

capable of running successfully the gauntlet of extraordinary risks such as never occur under peace conditions, as instance the use of them to harry infantry, and so forth, from altitudes of a few hundred feet only. In other words, war has enabled flying machines to prove themselves capable of achievement enormously greater than any one would have been justified in imagining possible before the outbreak of the campaign, and more than sufficient for the standard of civilian needs. The far greater risks naval and military airmen have engaged in during the war produce, inevitably, a reflex action on the minds of the general, in that, whereas formerly people spoke of the occasional accidents of flying as being very, very grave, now the general attitude is to draw attention to the regularity of flying performance and to stress the infrequency of failures. Hence one is glad to observe that in schemes for post-war passenger aerial services, for example, such as they are now so busily engaged upon bringing into being, the more responsible of the leaders of flying enterprise are basing each on the assumption that on occasion there will be failures in individual performance. Therefore the necessary provisions are to be made in the matter of supplying spare machines, establishing stations at frequent intervals, and other requisites of bringing into being properly organised services. These are all cardinal features of the responsible schemes. All this makes for the further establishment of firm public confidence in the present and future of flying.

Financial Aspects—Sound and Otherwise

At the moment when we are in prospect of passing from the age of dreams to the realisation of man's age-long wish to travel through space, it is as well to have in mind that this is either about to be made possible or impossible, not by the further advance of aerial science and of aircraft construction, but solely by the aid of finance, without which every scheme would fail to mature. The financial aspect of flying is divisible under many heads. One may touch on a few of them briefly.

Is British flying enterprise to be throttled at the outset by legislation and bureaucracy, or is the way to be made and kept clear for that British genius for individual enterprise, by which alone we did our splendid share of winning the world war, and without which stagnation becomes a mere matter of time? Is private and public aeronautical enterprise to be fostered or quashed?

We have to find big sums of money for manufacturing and maintaining the equipment for aerial transport enterprise. Before the war practically all aircraft manufacturing worthy the name and conducted with some regard to the canons of commerce, was done by private enterprise. Consequently undesirable practices were in the main to be sought. At a period when it exercised most arbitrarily its veto to control the issue of appeals to the public for fresh capital, nevertheless during the war we had the scandal of the Treasury sanctioning efforts on behalf of utterly indefensible aircraft schemes while repressing others that were thoroughly desirable. As a result the movement has not been merely injured in temporary fashion; it has, besides, been injured permanently by Government action. Past financial scandals echo down the years. Alas! in this country we cannot say that there has been one such case only; we have, instead, to speak in the plural. Those of us who pioneered the aviation movement are agreed that we did not risk our lives, not spend our time, nor put ourselves to charges in connection with early endeavouring to travel through space for any such ignoble thing as that or the further establishment of bureaucracy though we foreknew clearly that one of the great uses to which, aircraft would be put would be in connection with whatever war should break out first after the evolution of practical aviation.

Even as war is not the noblest and most gainful use to which man can put aircraft, so are the enriching of company promoters, or the provision of an extravagant means of livelihood for a spell on the part of adventurers, or the establishment of Government control to provide jobs for Placemen, not ends for which we have striven without thought of personal gain but wholly for a noble enthusiasm. Consequently, all those who are honestly enthusiastic about flying, pioneers and new comers alike, should take any and every opportunity to warn the public in general that its financial aspect has already been seared, even as was that of motoring in the early days; and that to-day the future of flying is gravely menaced by political jobbery. My aim is not to train the public to withhold capital from aviation enterprise. On the contrary, it is eminently desirable to increase the flow of public money in the direction of developing sound aerial enterprise to a greater extent even than the public is prepared for to-day; but we must teach that public, even if

its interest in flight is merely one of cupidity, that there are financial schemes and financial schemes in connection with flying; that there will always be such; but that, if it makes its vote and voice felt, it can exterminate here and now the fatal blight of bureaucracy, of whose threat to the movement anon, and can protect itself against bucketshop schemes.

Fortunately, interest in flight is becoming so widespread that investigation within the normal compass of the individual, *provided it is always carried out in more than one direction*, should enable one to discover where are the flaws, if any, in a given scheme. It must be had in mind that it is to the gain of the movement in general, as well as for the good of all who are honestly engaged in it, that every bad financial scheme brought forward hereafter should be nipped in the bud in place of going through, as alas, a certain number have gone through in the past. Every time a sovereign is secured for what may be styled company swindlers—one is not writing idly, for of course the City company promoters, of whom relatively little has been heard during the war, have been hatching schemes wholesale in connection with the new movement—ten pounds are lost to the future financing of legitimate flying enterprise, because once a believing section of the public get bitten it holds off the very propositions which it should support. In the times that are coming it is eminently desirable that the public in general should finance quite a number of sound British aircraft schemes. For one thing, it widens the intelligence of those who have a stake, therefore a personal interest in the wellbeing of the movement. The more "small people" you get financially interested in a given movement the wider spread becomes understanding of that movement. One convert to the practical value of flying makes at least half a dozen every year. We have arrived at the stage when we want the world to recognise the truth; if we will but pursue our opportunities flying is part and parcel of our work-a-day life.

Who are the Future Buyers of Aircraft?

This brings us to the next financial phase. Who are to be the buyers of aircraft hereafter? The Government should be the biggest buyers; but, possibly, to a large extent it would purchase aircraft made more or less in its own factories. At least there will have to be a very radical change over the moods that have predominated hitherto if the fact proves otherwise. In any case, when we have in mind the big factories, including the Government owned ones, all over the country, and the cry for employment, doubtless many Service machines will be made by the Government; but we should be able confidently to look to the Government to obtain fleets of postal and such-like machines direct from the industry. However urgent the need to economise expenditure now the war is over, nevertheless we must have always a big scale aircraft enterprise exploiting native genius and individual initiative to the limit. Therefore, it is obvious that those Services of the Government which pay their way, such, for example, as the coming aerial post, should be supplied by equipment obtained in open market direct from the industry.

Bringing Flight within the Purse Range of Folk of Small Means

But if the flying movement is to attain anything like full development by far the greatest output of machines made in these islands must be for the supply of aerial equipment for transport companies and private sportsmen. This first category one puts as most important by reason of the fact that, if the thing is traced to an end, you embrace a public which is a thousand to every one who can be mustered to buy and maintain his own flying machine. Doubtless it is the wish of at least 30 per cent. of the inhabitants of these islands to make aerial journeys irrespective of their time-saving and such like advantages. Unquestionably, point to point aerial voyages, as distinct from the soon-to-become obsolete flight round an aerodrome, will be a big feature of aerial enterprise in the near future. Thus, the passage from north to south London which, by any means of the locomotion available, occupies an hour or more, but could be made in a few minutes and at a cost of a shilling or so per head—certainly no dearer than present railway charges—by aerial omnibuses taking a sufficiently circuitous route to avoid thickly populated areas. This phase of the development, however, will not commence yet awhile, a remark that applies equally to taking workers up to cities in the morning and conveying them back at evening by aircraft. London to Paris, London to Rome are by no means the only aerial transport lines that need and which will be established in 1919. Certainly, in the near future by reason of the time saved, and of the fact that the cost need not exceed that of first-class railway train service to-day, we shall have regular

flying services between London and Cardiff, London and Bristol, London and Birmingham, Manchester and Glasgow.

Reasonably Cheap Public Aerial Services

Another development we may confidently expect to materialise shortly is the seasonal public aerial service, as from the big centres to the more popular of the summer health resorts in these islands, say from London, or the Midlands, to the East Coast; or to Devonshire; or to the coast of Wales. The public should not overlook the fact that huge aerodrome schemes have been embarked on all over the country, many of which could be profitably leased by the Government at least in part for ventures of this sort, though such is far from the official intention at the moment, as will appear in due course. Nevertheless, all such enterprises as these should in the end be financed by those members of the public who, for the most part, cannot afford to own a middle sized motor vehicle, far less a flying machine. To enjoy such a change as travelling by the Magic Carpet to the place chosen for his summer holiday, many a clerk would gladly save for a year, not grudging a farthing of the money spent on gaining an experience. One need not say that the educational value of such will prove extraordinary. Certain it is, therefore, that similar winter season services will be established to the Riviera, to Egypt, Morocco and so on.

But while we are on the matter of finance, which is really the key to the practical application and the fullest possible exploitation of flight now that aircraft and engine constructors have solved all the other problems to the necessary degree, the question of fuel supplies for aircraft will have to be gone into very seriously by the Government. Lord Weir of Eastwood, the Air Minister, has revealed already that at the time "Cease fire" sounded there were 22,000 British pilots in process of training. He has expressed soundly based anxiety that all our aerial efforts in this war should not be allowed to

lapse, but that those costly training schemes, as well as the equipment series, should really prove the basis of a start to yet better things. But inasmuch as an aeroplane or a seaplane uses an engine which has not merely to propel it forward, as does the motor of a taxicab or of an omnibus, but has, besides, to develop sufficient force to lift the entire weight of the aerial vehicle, it follows that such big aerial machines as alone would make passenger services practical propositions, use, some of them, a gallon of petrol for every five miles for each engine. As some have four engines, in some cases the cost of flight is a mile, or a mile and a quarter, per gallon of petrol. Even prospective reduced prices of motor fuel will be so high as greatly to limit the rate of development desirable.

Wanted—Immediate Government Policy Concerning Fuel Costs for Aircraft Use

We want an immediate decision by the Government that, to encourage the establishment of flying services and their use by the public as the main means of rapidly developing the movement, the necessary high grade engine fuels for such services will be supplied at special rates. For a period of years, at any rate, all fuel so used should be duty free. Such fuel could be distributed by the suppliers with the maximum economy in that it would be a case of bulk supply, with none of the appalling waste of labour involved by placing it in two-gallon tins. Provided the thing were organised properly, it ought to be commercially possible to encourage flying by supplying motor fuel for this purpose at rates not exceeding the lowest granted to, say, the omnibus or taxicab companies according to the largest contracts those enterprises have placed in the past, and are doubtless placing at present. Of course, in the case of aircraft, very much better quality spirit is needed. The point is that it will pay the fuel trade, as well as the nation, to make flying as cheap as possible.

(To be concluded.)

The King's Speech

In the message sent by His Majesty in reply to addresses from both Houses of Parliament on November 19th, there was the following tribute to the Royal Air Force: "Let us remember also those who belong to the most recent military arm, the keen-eyed and swift-winged knights of the air, who have given to the world a new type of daring and resourceful heroism."

A Select Committee's Opinion

In their second report, just issued, the Select Committee on Transport state: "In view of the improbability of aerial transport being available upon any considerable scale for many years to come for the internal transport of passengers and goods, the Committee has made no inquiries in regard to it."

Release of Wood-Working Tools

THE Minister of Munitions announces that restrictions upon the release of new machine tools and wood-working machinery have been removed, provided such machines are purchased from firms or persons holding permits from the Minister to trade in such articles.

The End of the "Campania"

It was announced last week that the famous Cunard liner, the "Campania," was recently sunk in the Firth of Forth through breaking from her moorings and colliding with a battleship. She went down before she could be beached, but fortunately all on board were saved. For some time she had been used as an aeroplane-carrying ship, and had undergone considerable structural alterations. Her funnels, for instance, were placed abreast and her decks laid bare, thus completely transforming her appearance.

Wireless 'Phones for Aircraft

ONE of the developments of wireless work which has now been disclosed is that by which aeroplane pilots are enabled to keep in telephonic communication with their station and with each other. A demonstration was recently carried out at Washington. President Wilson, by the aid of the wireless telephone, from the portico of the White House, directing a series of evolutions by half-a-dozen Army aeroplanes. The telephone, it was stated, had a range of six miles.

Air-Raid Damage—£677,000

THE Committee on War Damage, writing to Mr. G. L. Wardle, M.P., Parliamentary Secretary to the Board of Trade, again urging the Government to give "full effect, without further delay, to the principle of national responsibility as accepted by the Prime Minister on July 13, 1917," declares that from returns sent in from fifty-one municipal districts which have suffered from air raids or bombardments it is shown that at least 488 persons were killed, 1,014 injured, and the estimated cost of making good the damage to property is £677,773.

A Farman "Goliath"

It is not only in this country that the possibilities of post-war commercial aviation are realised. We understand that a new commercial aeroplane has just made its appearance at the Farman works at Boulogne-sur-Seine. The new machine, which has been christened the "Goliath" has made its official trials, piloted by Bossutreau. It is of the F.60 type, and is capable of carrying 20 passengers. It is said to have a speed of 160 kilometres and to be able to make a continuous journey of 3,000 kilometres. Fitted with floats the "Goliath" is expected to be able to undertake the trans-Atlantic journey. For a start the new machine will, we understand, be employed on a Paris-London passenger air route.

Bleriot also in the Running

We are informed that at the Bleriot works two new large four-engined aeroplanes are nearing completion, which will, it is expected, be suitable for aerial transport in the colonies, where roads are none too good and railways non-existent. In such cases the aeroplane will link up by postal air service one colony with another, and with the capital, while numerous other spheres will doubtless be found, in which the large weight-carrying aeroplane will be of inestimable service.

Aircraft Workers' Holiday

EMPLOYEES of the Royal Aircraft establishment at Farnborough have been granted a holiday as from noon on Saturday next till the following Thursday morning, with pay, in order to mark the signing of the armistice.

A Mishap with the Paris Aerobus

WHEN an "aerobus," which had taken twenty passengers for a trip round the suburbs of Paris on Sunday was landing, it fell and eleven of the occupants were injured.

An Aerial Escort for the U-boats

WHEN the first instalment of twenty German submarines came across the North Sea on November 20th, they were met by a squadron of British aircraft, including the rigid airship R26, a Blimp, and three flying boats.

The Kaiser's Aeroplane Post

FROM reports received in Paris from Dutch sources last week, it appears that the Kaiser was still in continual communication with Germany, the castle at which he was interned having a convenient wireless station, while German aeroplanes were said to be continually going over the frontier and dropping messages.

Handing Over the Spoil

In a dispatch from General Headquarters on November 23rd, it was stated that a number of aeroplanes and quantities of rolling stock have passed into our possession.

STRESS OPTICAL EXPERIMENTS*

By MAJOR A. R. LOW, R.A.F.

SECTION NO. 1.

Note on the Determination of Stress by Optical Methods

(1) Historical

Sir David Brewster in 1816 discovered that an isotropic transparent solid, such as glass, behaves as a temporary crystal under stress, and when examined in the polariscope between crossed Nicols exhibits the characteristic colours of crystalline plates.

Since Brewster's day this property has been studied by a number of observers. Clerk Maxwell showed that isinglass jelly would show the colours under stress when in its soft state, and retained them, more or less permanently, when allowed to harden under strain. To him is due the first attempt to apply this effect to the exploration of the stress system in the plane of a strained plate; experimental investigations of this nature were afterwards carried out by Major Filow, Carus Wilson, and Prof. E. G. Coker, F.R.S.

Neither glass, however, nor isinglass jelly forms a suitable material for the investigation by this means of stresses in engineering structures. Glass does not lend itself readily to the construction of such models as regards shape and jointing. Isinglass jelly is altogether too soft. Prof. Coker, however, discovered that celluloid, or, more properly, xylonite, possesses this stress optical property in a very high degree. This substance is easily worked and cut to any required shape,

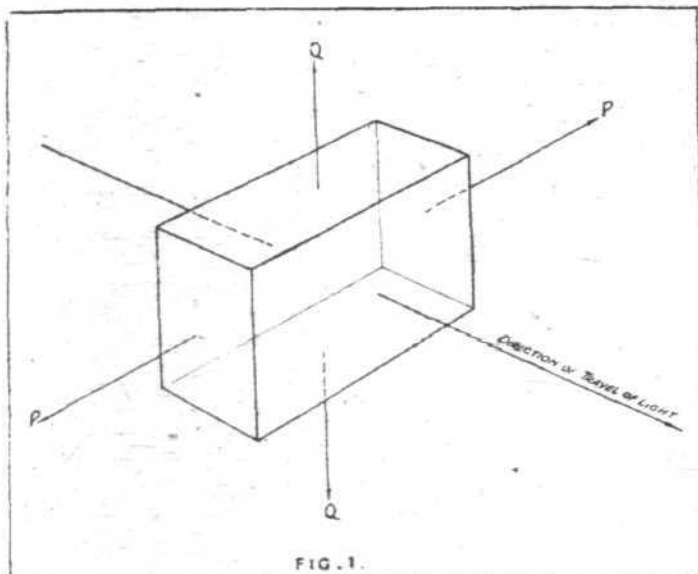


FIG. 1.

and will take the necessary fittings without being damaged. The method at once becomes a practical one from the engineering standpoint.

(2) Elementary Theory

An elementary theory can be given as follows:—Consider a rectangular block of transparent material, Fig. 1, under uniform tensions (P), parallel to one set of edges and (Q) parallel to another set of edges.

Let light be passed through the material in a direction perpendicular to both stresses " P " and " Q ". Then it is found that the light, on entering the material, is broken up into two portions. One is polarised in the direction of the stress " P ," the other in the direction of the stress " Q ."

These two light waves travel through the material at a different rate, so that, on emergence, one of them is retarded with respect to the other. If we call " r " the relative retardation, then it is found that

$$r = Ca(P - Q)$$

where " a " equals the thickness of the material traversed, and " C " is a coefficient depending only on the nature of the material and the wave length of the light.

So far the most recent investigations confirm the accuracy of the above law up to the highest stress that the material can bear. This is certainly the case as regards glass. As regards xylonite, it has not so far been possible to investigate the law with the same order of accuracy, but what investigations have been made confirm the rule that the relative retardation is strictly proportional to the difference of the two stresses.

It is important to note that the relative retardation is

proportional in every case to the difference of the stresses and not to the difference of the strains. Thus the method will not lead to a determination of the strain, or curvature, unless the material is *not* strained beyond the elastic limit, in which case the stress is proportional to the strain. On the other hand, a material may have had permanent strain, but unless this is accompanied by a corresponding permanent internal stress, there is little or no optical effect. The method thus provides a *direct determination* of the actual tensions and pressures occurring, and enables us to explore the material dynamically—whereas any method of deflections, such as must be used with a model of opaque material, only gives us the visible strains from which the stresses are inferred by a process which lacks validity so soon as the elastic limit is passed.

Returning to the consideration of the light emerging from the block, it appears that if the relative retardation of the two waves is a whole number of wave lengths, they will emerge in the same phase in which they entered, and, on re-combining, the effect will be the same as if the block had not been present.

Now a Nicol prism is a block of Iceland spar, which only transmits light polarised in a particular azimuth which is called the axis of the Nicol prism.

If then two Nicol prisms are placed one behind the other with the axis perpendicular, the second cuts off all the light which is transmitted by the first, and on looking into the second prism the field is dark.

If, however, a crystalline plate, or a piece of xylonite under stress, be now introduced between the Nicols, the light is in general restored when the directions of stress are different from the axes of the Nicols, the light transmitted by the first prism being depolarised; but if for any given kind of homogeneous light the stressed xylonite produces a relative retardation of a whole number of wave lengths, we have seen its presence does not affect the character of the transmitted light. Thus, light of this particular colour will be extinguished in the field.

(3) Changes in a Uniform Field as Stress Increases

Consider now the changes in the field when the stress difference ($P - Q$) is steadily increased from zero.

At first there is no retardation and the field is dark. For a small stress all colours will be restored and the field will be white.

As the stress increases a time will come when one of the colours of the visible spectrum will again be extinguished. This will occur when

$$\lambda = Ca(P - Q) \text{ or } a(P - Q) = \lambda/C,$$

λ being the wave length of the colour in question. Now it has been found that C varies somewhat between the extreme red and the extreme violet, but not more than about 10 per cent. to 20 per cent. of the whole. The result is that λ/C always increases as λ increases.

Thus, the first colour to be extinguished as ($P - Q$) increases is that of lowest λ , that is the violet and blue. The remaining colours give an orange which deepens to a red, and this changes somewhat sharply, to a blue, as we go through the so-called "tint of passage" which corresponds to the extinction of the bright yellow rays.

As we further increase the stresses, white reappears, then a pinky red, followed by a second order tint of passage, itself followed by a greenish blue. The series of colours are then repeated, the reds approximating at each order more and more to a pale pink, and the blues to a pale green.

If, therefore, we construct an exact scale of colours, we could invert the process, and from the colour in the field, at any given moment, deduce the actual stress difference to which the material is subjected.

In practice this would be a difficult process, and the risk of confusing colours of different orders would be considerable. Where, however, a certain indication can be obtained of the order of colour dealt with, this method, as we shall see, can be very usefully employed.

(4) Null Method of Measurement

Another method, however, removes this difficulty and enables the stress to be determined by a null method.

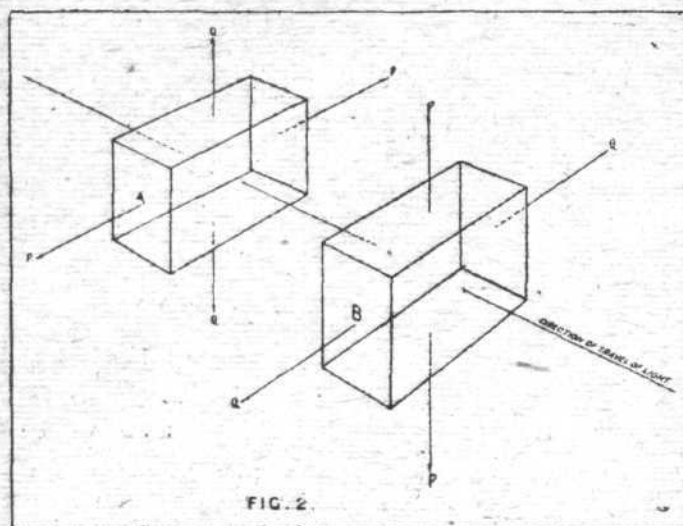
Let two blocks—A and B—of the same material and the same thickness be employed, and placed one behind the other with their edges parallel, Fig. 2. Let stress P and Q be applied to the blocks A and B as before with this difference, that in those directions in which the stresses on Block A are P and Q , the stresses on Block B are Q and P respectively.

Two such blocks under stress, corresponding stresses being

* Paper read before the Royal Aeronautical Society at the Royal Society of Arts, John Street, Adelphi, Strand, W.C., on Wednesday, November 20th, 1918.

at right angles, will be spoken of as crossed. To fix ideas, suppose that in the block A the stress P is applied horizontally, and the stress Q vertically. Then in the block B, P is applied vertically and Q horizontally.

Now the light traversing either beam is broken up into a horizontally polarised and a vertically polarised wave, and the conditions of travel of these two waves are inter-



changed in A and B. Thus if the horizontally polarised ray be accelerated with regard to the vertically polarised ray by an amount " r " after traversing A, the vertically polarised ray will be accelerated with regard to the horizontally polarised ray by the same amount " r " after traversing B, the net acceleration or retardation after traversing both A and B being zero. We thus get a black field if the two blocks are placed between crossed Nicols.

We may therefore ascertain the stress difference in a given specimen of material (the stresses acting in known directions) by placing in front of it a test piece of the same material and same thickness to which we apply known stresses in the same directions until we find that the field becomes black. When this is the case, the stress difference in the test piece and specimen are equal in magnitude and opposite in sign.

(5) Appearances in a Non-Uniform Field. Neutral, Isochromatic and Isoclinic Lines

Let us now pass to the case of the appearances presented when a flat slab or plate under stress in its own plane is examined in this way between crossed Nicols. In such a slab the stresses will vary from point to point. At any given point, however, the stress system can be reduced to two principal normal stresses (tensions or pressures) in directions at right angles—these directions being known as the principal axes of stress at the point. Every point

for which the principal stress difference is zero will appear black in the field and the locus of such points forms a black band or "neutral line." Generally on either side of the neutral line is a white area, in which the principal stress difference is slight. If the applied stress is sufficiently large on going outwards from the neutral line a rainbow band is met, beginning with orange and going into red tint of passage and blue. This is the "first order" coloured band. Beyond it will be a yellowish space, and a "second order" coloured band, reddish towards the neutral line and green away from it. These bands are called "isochromatic" lines, or lines of equal colour. Along any one isochromatic line the principal stress difference in the material is constant in magnitude. A mapping of the isochromatic lines therefore gives a picture of the distribution of stress difference throughout the material. As yield and rupture of many materials depends largely upon the value of the stress difference, such a picture gives immediate information as to the dangerous areas or fail points. These will necessarily be those points where the colour bands of highest order make their appearance as the load is increased.

The neutral line and the isochromatic lines, however, are not the only bands visible in the field. So far, in the previous discussion of the appearances presented by a uniformly loaded block, it has been assumed that the polarising axes of the two Nicols were not parallel to the directions of stress. On that assumption we have seen light was in general restored.

If, however, it happens that the polarising axes of the Nicols are parallel to the directions of stress, the light is never restored, for then, of the two waves in the stressed material, one coincides with the wave transmitted by the first Nicol, and the other is absent. The stressed material does not therefore depolarise the light, and the second Nicol stops it entirely.

It follows, then, that all points of the slab at which the directions of the principal axes of stress are parallel to the polarising axes of the Nicols will appear black in the field, hence one or more black bands or brushes corresponding to the locus of such points. Lines of this kind are called "isoclinic lines," or lines of equal inclination.

If the Nicols be rotated together, the isoclinic lines move in the field, but the isochromatic lines remain fixed. If the applied loads be increased in any given proportion, the distribution remaining the same, the isochromatic lines crowd in upon the neutral line. The neutral line and the isoclinic lines remain fixed.

The isoclinic lines are most useful when we do not know beforehand from other considerations the directions of the principal stresses at a given point. These directions can then be easily determined by rotating the Nicols until the visible isoclinic line passes through the point in question. The position of the polarising axes of the Nicols then gives the solution of the problem, and enables us to set our test pieces at the right angle if we use the null method of measuring the stress difference.

(To be continued.)

THE JUNKER ARMOURÉD BIPLANE

For some time past there have been rumours current of a German all-metal aeroplane in which, it was said, even the wing covering was of metal. It is not, however, until quite recently that we have been able to obtain reliable information concerning this machine. What is left of the Junker biplane, as the machine in question is called, is now included among the many interesting exhibits at the Enemy Aircraft View Rooms at the Agricultural Hall, Islington, where our representatives have been permitted to examine this machine in detail.

Owing to the damaged condition of the specimen on view it has not been possible to give, this week, more than a brief outline of the main characteristics of the machine. Later we hope to be able to describe it in more detail.

The Junker armoured biplane is designed for use as a trench fighter, and in contradistinction to the A.E.G. armoured biplane it was evidently designed with this object in view from the start, the armour not being attached, as a supplement, to an ordinary girder structure, as was the case with the A.E.G., but forming the main fuselage structure at the same time as providing the armoring.

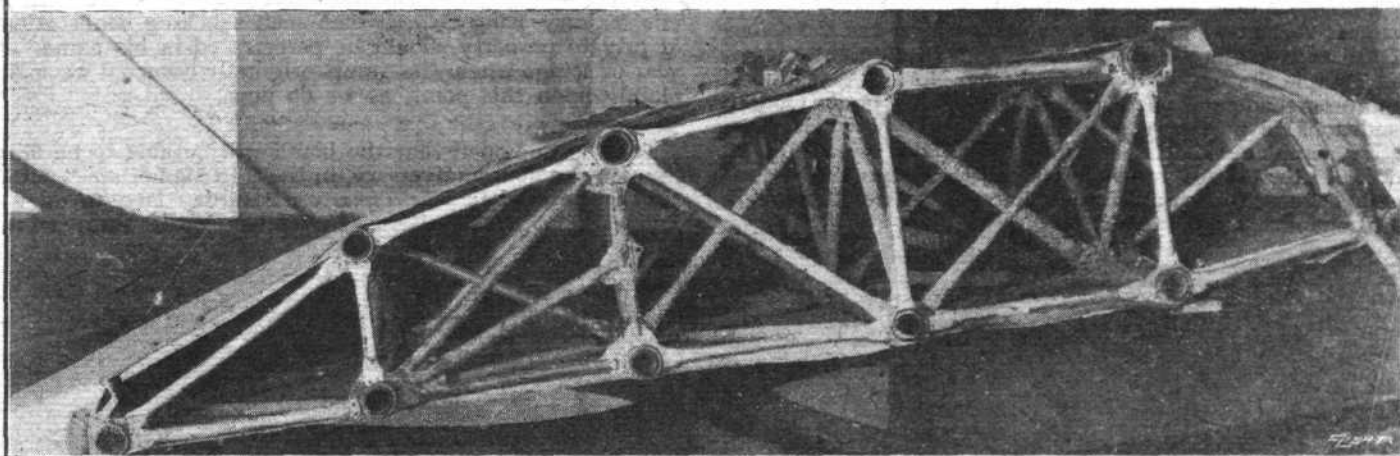
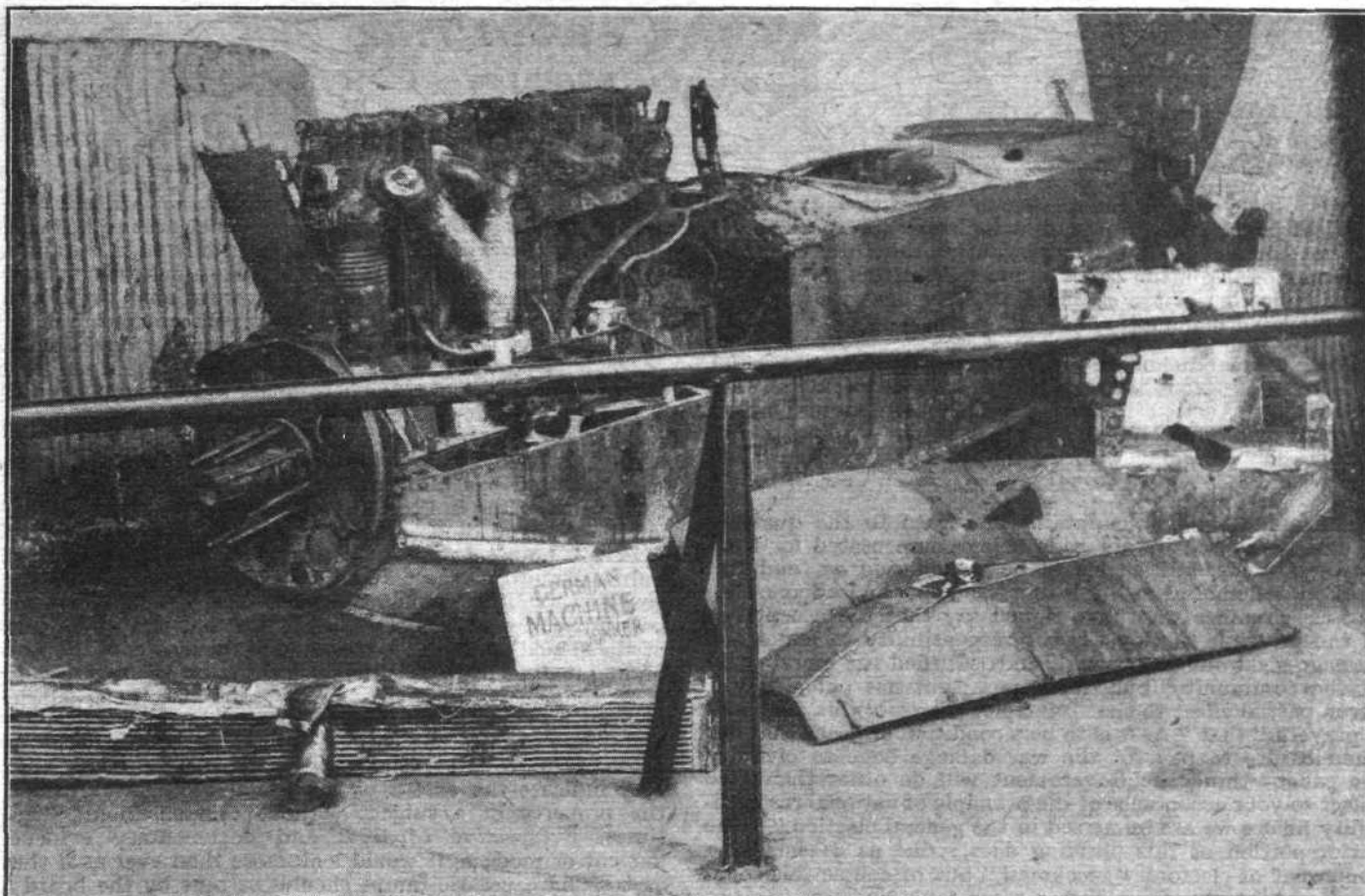
The shape of the front portion of the fuselage may be seen in one of the accompanying photographs. It has flat sides of armour plating, and a slightly curved top of aluminium. The bottom of the body is formed of three flat surfaces, the middle one of which is horizontal, the other two sloping so as to connect the edges of the horizontal bottom with those of the vertical sides. The engine, a 230 h.p. Benz, is also

protected by armour plating, which is detachable so as to allow access to the engine. This is accomplished by hinging the armour at this point, the port and starboard engine armour being separately detachable. In the accompanying photograph the engine armour of one side will be seen lying on the floor in front of the fuselage. The armoring is finished off just behind the gunner's cockpit, where it is continued across the fuselage by a curved armour plate shaped to form the gunner's back rest.

Of the rear portion of the fuselage nothing remains on the machine examined, and nothing can therefore be said regarding the details of its construction. Judging from such evidence as fittings for large diameter tubes at the four corners it would appear that the rear part of the fuselage has been built up of a tubular framework of Duralumin.

The wings of the Junker are of great interest as being of a construction very dissimilar to any so far seen. The internal construction of the wings is in the form of Duralumin tubes crossing diagonally and connecting the tubular spars, which latter are far greater in number than is ordinarily found in an aeroplane wing. It has evidently been the aim of the designer to distribute the spars over the wing section rather than to provide two spars located in the usual manner. In the Junker there may be said to be six spars if one counts the top and bottom tubes lying vertically above one another as one spar. The lower photograph will give some idea of the general distribution of the various wing members.

In section the planes of the Junker are enormously deep,



THE JUNKER ARMOURED BIPLANE.—Top: Front portion of fuselage, with engine. Bottom: End view of top-plane centre-section.

the maximum thickness of the top plane being about 16 in. The chord of this wing is a little over 8 ft. while the chord of the bottom plane is approximately 5 ft.

From the fact that no trace was found of inter-plane strut fittings it would appear that these members have been dispensed with in the Junker. It appears that the top plane centre-section was carried on a structure of tubes from the body, while the bottom plane appears to have been attached to the bottom of the fuselage by a series of diagonal struts. This arrangement, which would be made possible by employing such a deep wing section, would have the advantage that the gunner could fire forward at a considerable angle without danger of hitting a vital member of the wings.

The undercarriage is in the form of two Vees, attached to the lower plane some distance out. From this point the bracing tubes of the bottom plane run to the body, thus transmitting the shock to the fuselage without, presumably, causing excessive bending stresses in the lower wing spars.

The wing covering is in the form of corrugated aluminium sheet, and it was noticed that this did not form a fair curve over the wing framework, but was rather in the nature of a series of straight lines. This could hardly improve the aerodynamic qualities of the wing section, but on the other hand it is possible that the effects are not great. Later we hope to be able to give some details of this interesting machine.

The Enemy Aircraft Exhibition

It has now been decided to throw the Enemy Aircraft Exhibition at the Agricultural Hall open to the public on all weekdays and to extend the hours during which it is open from 10 a.m. to 10 p.m. It will also be open from 3 p.m. to 10 p.m. on Sundays.

An Aero Exhibition Next Year

AN announcement has been issued by the Society of Motor Manufacturers and Traders setting forth their intention

to organise forthwith a full series of Exhibitions. The annual Touring Car Exhibition will be held at Olympia in November, 1919, and the series of International Aero Exhibitions commenced in 1909 is to be forthwith resumed, and it is confidently anticipated that there will now not be that lack of public interest in aircraft which caused past exhibitions to prove a serious financial loss. Exhibitions of commercial and agricultural motors and marine equipment are also promised.



It is a little curious to note that in the terms of the Armistice, although two thousand aeroplanes are specified, it has not commended itself to the authorities to ask for the surrender of any of the Zepps or super-Zepps. Is this a lapse, or an indication of the estimate of the value entertained of these inflated mammoths, for military purposes?

FOR a German helmet of the sixteenth century a nice round little sum of £420 was paid the other day at Messrs. Glendining's Auction Rooms, a figure which stands out by contrast somewhat broadly with the five-shilling Zepps which went a-begging a fortnight ago out Friedrichshafen way.

THE muddle which maintains in regard to the question of damage caused by air raids being compensated for from Imperial funds, still seems to be meandering on, and last week in a memorial to the Prime Minister, the leaders of the various churches who have signed say that the acceptance of the principle of Government responsibility to make this damage good out of national funds satisfied the moral sense of the community, but the Government has only, as yet, given partial effect to that principle. Further this memorial "prayeth" that "As it is to be a condition of peace that our enemies are to pay for the war damage done to civilians we cannot think the Government will do other than give effect to your acceptance of the principle of national responsibility before we are immersed in the general election." The latter portion of this pleading does strike us as smacking somewhat of electoral "blackmail," but of course this could hardly be, coming from such a respectable quarter.

A BILL has been drawn up by the London County Council for next session by which they seek to enforce the provisions of the Metropolitan Railway Acts, under which the roof of the Temple Station as approached from Norfolk Street shall be a promenade and open space. Surely this, under modern conditions, is wasting a good opportunity. Why not make it an aeroplane landing station? The idea opens up all sorts of possibilities and reminds one that there are a good many other stations of a similar character scattered throughout London. Think it over.

THAT very admirable department of the Air Ministry, the Weather Bureau, is assuredly one which it is to be hoped the authorities will see their way, not only to maintain at its full present strength, but to elaborate to almost unthinkable capacity. What this will mean to commercial aviation is almost beyond figuring out at the present moment. It will be one of the greatest assets for favourable development which it is possible to conceive, especially within the next ten years or so, when there is so much to learn and map out in regard to the realms of the air.

AN "additional rule" in which the Air Ministry apparently are interested has been put forward by the Master of the Rolls to the King in Council, and has received his approval, for the disposal of documents which are not considered of sufficient public value to justify their preservation in the Public Record Office. We just wondered at first glance how the Air Ministry might be concerned in this, but it may possibly be found from the suggestion that the whole thing has been held up, owing to the mind of the Master of the Rolls finding it difficult in reaching a decision on the future value of State documents, when at the present time the conclusion of legal arguments has been postponed in the De Keyser's Hotel case so that the Crown may have an exhaustive search made in the Record Office for any papers of early date which may indicate the extent of the Royal Prerogative to seize the property of a subject without compensation. These times, irrespective of legal and documentary evidence, ancient or modern, it would look more than ever as if these sort of bureaucratic ramps should be sent by the board as obsolete, as it is quite obvious from every point of view that it is neither by the authority or with the personal wish of His Majesty King George that such shocking confiscations of private property should be perpetrated in his name. A year or so ago when the ramp originally occurred we spoke plainly upon this point, as we do now.

It is to be hoped that the blank will be able to be filled in upon the next anniversary, in the "In Memoriam" notice which appeared in *The Times* on Saturday last, to an unknown pilot "shot down November 23rd, 1917, whilst



AN INCIDENT OF THE KING'S VISIT TO THE FRONT.—Men of the R.A.F. line up on the roadside to cheer the King as he passes in a Rolls-Royce.

attacking a German strong point S.W. of Bourlon Wood, in the effort to help out a company of the Royal Irish Rifles, when other help had failed," and so reduce the number of unknown heroes by one.

NOTICE that in discussing American naval policy and the future of the German warships last week, in the Senate Committee on Naval Affairs, it was suggested that the German Navy prizes might be distributed to the Allies according to the size of their navies, a suggestion, however, not meeting with very pronounced approval, on the ground that it was not necessarily fair to give most to those who already had most. Surely very little consideration would suggest that, if the British Admiralty thinks well of it, there should be at least firstly, vessel apportioned to England for all her warships, &c., lost during her holding of the seas for the first four years of the War, with proper compensation in kind for all the crews as well. It's a bit rough to have to think that after Britain having maintained, all on its own, the real freedom of the seas against the most savage murderer of civilisation the world has ever known, for four solid years, it should now have to even think about distributing the spoils which she compelled to keep behind secret minefields or suffer annihilation. We fancy somehow the finish, when it comes, of this "freedom of the seas" business, will be a little bit surprising to a good many people.

THE aerial surveyor has been mooted, and now we learn that the flying fireman has arrived! Recently there was a very bad explosion at the Gillespie shell loading plants at Morgan, N.J., U.S.A., and by means of aerial observations from an Army flying machine it was found possible to direct the fight against the flames and prevent a great deal of loss of life and material that would otherwise have ensued. Not least of the salvage effected was that of a matter of 8,000,000 lbs. of T.N.T., which was in imminent danger of exploding. The aeroplane was manned by an American pilot, and carried a British observer, Major H. L. Armstrong, the latter giving instructions to the firemen. Before the machine came to the assistance of the firemen several ineffectual attempts had been made from the ground to learn the extent and progress of the fire, and where it would be safe to send relief parties. The aeroplane kept at a height of about 100 ft. for 20 minutes, thus enabling the observer to make out openings in the walls through which the explosives could be taken out.

At a dinner recently given by the Society of Automotive Engineers in America to Orville Wright an interesting souvenir was presented to the guests, in which was included an account written by the pioneer himself of his earliest flight:—

"In order to show the way in which the machine operates, let us fancy ourselves ready for the start. The machine is placed upon a single-track rail facing the wind, and is securely fastened with a cable. The engine is put in motion, and the propellers in the rear whirr. You take your seat in the centre of the machine beside the operator. He slips the cable, and you shoot forward. An assistant who has been holding the machine in balance on the rail starts forward with you, but before you have gone 50 ft. the speed is too great for him, and he lets go. Before reaching the end of the track the operator moves the front rudder, and the machine lifts from the rail like a kite supported by the pressure of the air underneath it. The ground under you is at first a perfect blur, but as you rise the objects become clearer. At a height of 100 ft. you feel hardly any motion at all, except for the wind which strikes your face. If you did not take the precaution to fasten your hat before starting you have probably lost it by this time. The operator moves a lever: the right wing rises, and the machine swings about to the left. You make a very short turn, yet you do not feel the sensation of being thrown from your seat, so often experienced in automobile and railway travel. You find yourself facing toward the point from which you started. The objects on the ground now seem to be moving at much higher speed, though you perceive no change in the pressure of the wind on your face. You know then that you are travelling with the wind. When you near the starting point the operator stops the motor while still high in the air. The machine coasts down at an oblique angle to the ground, and after sliding 50 or 100 ft., comes to rest. Although the machine often lands when travelling at a speed of a mile a minute, you feel no shock whatever, and cannot in fact tell the exact moment at which it first touched the ground. The motor close beside you kept up an almost deafening roar during the whole flight, yet in your excitement you did not notice it till it stopped."

And this was only a decade ago, while now the man in the street feels no more than a pallid interest in the fact that regular aerial communication is soon to be established between London and Paris!

It seems very hard lines that, after enlisting at 18 years of age in the Spahis, and running a thousand windy hazards throughout the course of the war, the great French ace, Capt. Pinsard, should have succumbed, when all the guns were stilled, to the influenza demon. An officer of the Legion of Honour, he had brought down 30 or more German machines, and he was the first man to fly the Hispano-Suiza engined Spad.

As a boy, Pinsard served three years in Morocco, where he received his first decoration. He did a great deal of military steeple-chasing, but this soon palled on him, and in 1911 he took to the air. In 1912 he took his ticket. When the war broke out he was appointed *marechale des logis*, and was attached to the historic escadrille M.S. 23, to which Roland Garros, Marc Pourpe, Eugene Gilbert, and Lacrouze belonged. Attached to General Castelnau's army, he soon achieved a reputation as a pilot of the greatest dash. Once he was brought down in enemy territory on a Morane parasol. He set to work blandly to diagnose the fault, smoking endless cigarettes, and humming the airs of his native Montmartre. He was just able to leap off the ground when the enemy patrol came in sight, and escaped with nothing worse than a singeing. Pinsard was raised to the rank of second-lieutenant for his valour in bombing the Grand Headquarters of William II, but early in 1915 he was taken prisoner. He and a fellow prisoner, Lieut. Menard, succeeded, after several fruitless attempts, in getting away. It took them three weeks to reach the frontier. They arrived delirious and more than half starved.

Within a month Pinsard was back over the lines; at his own request, be it noted, for escaped prisoners are excused duty at the front, on the ground that they would be shot if recaptured. In company with Guynemer, Heurtaux and Deullin he instituted the new sport of contour-flying, with disastrous effects on the morale of the Boche troops. It was for this that he received the Legion of Honour. Frequently he undertook journeys of as much as 400 kilometres into enemy territory, avowing that he would never be taken prisoner again, and carrying a revolver to that end. He narrowly escaped death as a consequence of terrible injuries received while trick flying at a review, only to die at last in his bed, like any sober citizen.

TEN YEARS AGO

Excerpts from "FLIGHT" of November, 1908

MAURICE FARMAN ENTERS THE FLIGHT ARENA

Impelled, no doubt, by the remarkable success of his brother Henry, Maurice Farman has for some little time been at work getting ready an aeroplane of his own upon the biplane principle and on the lines of the Wright machine. Mr. Farman has located himself at Buc, where already Esnault-Pelterie and Henry Kapferer are installed with their aeroplanes. The motor which Maurice Farman will use will either be a very light R.E.P. or possibly a 35 h.p. Renault, probably the former.

PROGRESS OF WILBUR WRIGHT

During the past week, Wilbur Wright has continued steadily with his pupils, Capt. Lucas Girardville and Count Lambert, whilst on Friday of last week he made two noteworthy performances. First a flight at a height of 50 metres, thereby winning the Sarthe Aero Club's prize for high flight, and secondly, by making a flight without using his usual derrick launching apparatus. The latter performance goes to show that this is not an absolutely necessary part of the equipment, but is only used for convenience in starting.

COUNT LAMBERT FLIES UNAIDED

Wilbur Wright must have been a proud man on Tuesday last, for then he was able to demonstrate that the power of manipulating his machine is not his own special gift. Then, for the first time, the aeroplane successfully progressed through space with a new pilot at the helm. Count Lambert, although accompanied by Wright, took complete control of the aeroplane, and made two flights of about 15 minutes each. This performance is the climax of Wilbur Wright's conquest of the air.

"ANTOINETTE IV"

On Wednesday of last week, M. Welferinge had the monoplane "Antoinette IV" out at Issy, and made several short flights of between 200 and 300 metres in length. On Monday last, the monoplane was given another trial and flew for between 600 and 700 metres at a height of about 5 metres.

THE ROYAL AIR FORCE

London Gazette, November 19th.

The following temp. appointments are made at the Air Ministry:—
Staff Officers, 3rd Class.—And to be actg. Capt. whilst so employed:—Maj. A. J. Currie; Oct. 9th. Lieut. H. Fletcher; Oct. 10th. Lieut. H. B. Dresser; Nov. 6th.

The following temp. appointment is made:—
Staff Officer, 3rd Class.—(Graded for purposes of pay at Air Ministry rates.)—R. G. Parry, D.S.O. (Eng. Lieut., R.N.), and is granted a temp. commn. as Capt.; July 4th (substituted for notification in *Gazette*, Oct. 18th).

The following temp. appointments are made:—
Brig.-General (Air Staff).—K. Wigram, C.R., D.S.O. (Bt.-Col., Temp. Brig.-Gen., Ind. Army), is granted a temp. commn. as Col., and to be actg. Brig.-Gen. whilst so employed; Oct. 3rd.

Staff Officer, 2nd Class (Q.).—Maj. J. St. A. King; Nov. 8th.
Staff Officer, 3rd Class.—Lieut. J. C. Watson, and to be actg. Capt. whilst so employed; May 22nd.

Flying Branch.

Capt. R. E. Darnton to be graded for pay as Capt. whilst employed as Capt. (A.); Nov. 4th.

Lieuts. to be actg. Capt. whilst employed as Capt. (A.):—H. R. W. Ellison; Oct. 27th. F. W. W. Wilson; Nov. 1st. J. Cunliffe; Nov. 6th. M. G. S. Burger, F. Gibbons, O. J. Rose, D.F.C., G. S. White; Nov. 5th. E. L. Raworth; Nov. 12th. J. C. Green; Nov. 13th.

To be actg. Capt. whilst employed as Capt. (A. and S.):—Lieut. G. C. Mackay, D.F.C.; Oct. 29th. Sec. Lieut. R. Jackson; Nov. 9th.

Lieuts. to be actg. Capt. whilst employed as Capt. (K.B.):—L. W. Baker; Sept. 6th. C. W. Hawker, M.C.; Oct. 9th. W. R. Phillips, D.F.C.; Nov. 4th. G. G. L. Blake, D.F.C., D.C.M.; Nov. 6th.

Lieuts. to be actg. Capt. whilst employed as Capt. (O.):—A. A. N. Haywood; Aug. 1st. J. W. G. Clark; Oct. 26th.

Sec. Lieuts. (actg. Lieuts.) to be actg. Capt. whilst employed as Capt. (O.):—L. J. Chandler, D. G. Fleming, W. Smith; Aug. 1st.

Lieuts. (Ad.) to be Lieuts. (A.):—F. M. Johnson; Oct. 23rd. W. L. S. Keith-Jopp; Nov. 8th. D. K. Sworder; Nov. 12th.

Sec. Lieuts. (Hon. Lieut.) to be actg. Lieuts. (K.B.) whilst employed as Balloon Comdrs.:—L. A. Sterling, M.C.; Oct. 26th. H. S. Starkey; Nov. 6th.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Q.):—A. F. Adams, L. J. Chandler, W. H. Dutton, D. G. Fleming, P. J. Hayes, K. C. McKenzie, A. Neeson, W. Smith, W. A. Thompson, E. J. Withers; April 1st. G. E. Durrance, J. F. Mehigan, G. J. Ross, H. J. White; May 9th. L. J. Booth, J. Bowen, G. Lansdowne, A. Lees, E. Smith; Aug. 18th.

The following are granted temp. commns. as Sec. Lieuts. (A.):—H. Chester-Master (late Capt., Army Chapns. Dept.); July 15th. J. W. Mason (Temp. Sec. Lieut., North'n R.); Oct. 13th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A.):—534194 E. J. Bell; July 29th. 48461 S. G. Massey-Lynch; Aug. 24th. 265641 A. E. Filby; Sept. 12th. 265085 C. Wise; Sept. 17th. 89702 K. D. Foster; Oct. 1st. 119877 J. L. Sleigh, 110689 C. E. Eastgate, 37735 A. W. Gilbert, 128177 A. W. Macdonald; Oct. 28th. 522764 G. W. L. Anderson, 47192 G. A. March, 48028 E. Gharage, 1750 H. R. Skilling; Oct. 29th. 55 959 F. E. J. Davis; Oct. 30th. 12450 H. J. E. Smith, 28149 H. N. Bradbrooke, 128382 W. J. Humphries, 110127 A. Shildrick, 52496 S. P. Tarrant, 45855 J. S. Walthall, 100363 W. Riddell, 110579 T. E. Seferth, 6626 R. W. Sinclair, 10/89751 J. A. Baner, 80586 A. D. Page, 10038 W. R. Tope; Oct. 31st. 100351 J. D. Sinclair, 117503 J. B. Gunn, 117782 R. Curry, 767400 W. H. Holton, 117474 D. Richmond, 110348 E. T. F. Brown, M2/4747 A. J. Fryer, 110304 L. D. Pinches, 183879 H. C. Howard, 154388 B. Hopkins, 4821 J. W. M. Hopkins; Nov. 1st. 110337 A. McWilliam, 128105 L. E. Headley; Nov. 2nd.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A. and S.):—128253 J. D. Farquharson; Aug. 30th. 137875 M. E. Noyce, 201062 C. N. Osborne, 137877 T. W. Osborne; Aug. 31st.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. Obs. Officers):—175376 K. C. Watson, 128463 L. J. Dennis, 11761 R. M. Allan, 110511 W. Connor, 536091 W. H. Dawkes; Sept. 5th. 178952 J. Brown; Oct. 12th.

515622 Flight Cadet A. C. Precious is granted a temp. commn. as Sec. Lieut. (S.); Oct. 31st.

Lieut. H. B. Parkinson is removed from the Service, the King having no further need of his services as an officer; Sept. 10th.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. F. C. Bowles; April 20th. Sec. Lieut. J. W. Mason (Sec. Lieut., attd. North'n R.); Oct. 20th. Lieut. C. J. I. Griffith, M.C. (Lieut., R.F.A., S.R.), Lieut. J. E. Williams (Lieut., North'n Yeo.); Nov. 8th. Lieut. R. A. Lane; Nov. 14th.

Capt. E. J. Crisp resigns his commn. to resume his medical studies, and is granted the hon. rank of Capt.; Nov. 20th.

Lieut. E. Holman relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; Nov. 20th.

Sec. Lieut. C. R. Macnamara relinquishes his commn. on account of ill-health, and is granted the hon. rank of Sec. Lieut.; Nov. 20th.

The following Sec. Lieuts. relinquish their commns. being physically unsuited for the duties of Pilots or Observers:—P. L. Lowenhoff, S. E. Moss, F. O. Prytz, C. H. Strong; Nov. 20th.

The date of appointment of Capt. (actg. Maj.) M. D. Barber is June 28th, and not as in *Gazette* Oct. 29th.

The surname of Sec. Lieut. J. L. Norton is as now described, and not as in *Gazette* Oct. 15th.

The notification in *Gazette* Nov. 5th concerning Flight Cadet G. W. H. De Carter is cancelled.

The notification in *Gazette* Nov. 5th concerning Sec. Lieut. C. R. Calder is cancelled.

Administrative Branch.

J. Harvey, D.S.O. (Lieut.-Col., T.F. Res.) is granted a temp. commn. as Lieut.-Col.; Sept. 27th, seniority from April 1st.

D. B. O. F. Lord Redesdale (Capt., North'd Fus.) is granted a temp. commn. as Capt., and to be actg. Maj. whilst employed as Maj.; Sept. 9th, seniority from April 1st.

Capt. J. T. Waller, M.C., to be actg. Maj. whilst employed as Maj. from (A.); Nov. 4th.

The following are granted temp. commns. as Capt., seniority from April 1st:—T. L. Stevens (Capt., A. O. Dept.); Sept. 9th. C. B. Booth (Temp. Capt., Lab. Corps); Nov. 2nd.

Lieut. (Hon. Capt.) C. H. Lewis to be actg. Capt. whilst employed as Capt., from (O.); Sept. 13th (substituted for notification in *Gazette* Oct. 25th).

To be actg. Capt. whilst employed as Capt.:—Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) J. G. Beckham; Nov. 5th. Lieut. J. W. J. Cheyney, from (T.); Nov. 6th. Lieut. B. D. Bellamy, from (T.); Nov. 8th.

Lieut. (actg. Capt.) F. G. S. Williams retains the actg. rank of Capt. whilst employed as Capt., from (A.); Oct. 25th.

Capt. C. E. Dalton to be Capt., from (S.O.); Nov. 4th.

Lieuts. (A.) to be Lieuts.:—V. B. Allen, W. A. Barnes, G. D. Wilson; Oct. 26th. E. H. Hereford; Oct. 28th. I. M. Fry, C. D. Kirkbridge; Nov. 1st. (Hon. Capt.) W. B. Powell; Nov. 2nd. C. F. Cowper; Nov. 4th. F. R. Pender; Nov. 7th.

Lieut. T. B. Fraser to be Lieut., from (K.B.); June 11th.

Lieuts. (O.) to be Lieuts.:—J. W. Winter; Aug. 8th. A. L. Crow; Aug. 19th. R. M. Pegg; Oct. 1st. E. F. Dixon; Oct. 21st. W. B. Judd. Oct. 28th. R. S. Rudd; Nov. 1st. C. H. Lawrence; Nov. 4th.

The following are granted temp. commns. as Lieuts, seniority April 1st:—A. Chalk (Temp. Lieut., Lab. Corps); April 12th. O. C. Skinner (Lieut. Lancers); June 18th. M. J. V. B. Smyth (Lieut., R. Irish R.), J. P. D. Mostyn (Lieut., R. Suss. R.); July 10th. S. H. M. Donaldson (Capt., Spec. List), and to be Hon. Capt.; July 24th. H. M. Kendle (Temp. Lieut., Wilts R.); July 26th. A. E. Miller, M.C. (Capt., W. Rid. R.), and to be Hon. Capt.; Aug. 18th. J. C. Bain (Temp. Lieut., E. York. R.); April 22nd. E. L. Davies (Lieut., Gen. List); Sept. 3rd. H. Lupton (Lieut., W. Yorks R.); Sept. 11th. G. S. Kilby (Capt., Lond. R.), and to be Hon. Cap.; Sept. 14th. A. F. Basset (Lieut., T.F. Res.); Sept. 18th. Sir C. S. Kirkpatrick, Bt. (Temp. Lieut. Spec. List); Sept. 20th. W. Grischoetti (Capt., Shrops. L.I., S.R.), and to be Hon. Capt., R. S. Hay (Lieut., Seaf. Highrs., T.F.), R. P. Kember (Lieut., N. Lancs. R.); Sept. 23rd. C. E. Bright (Lieut., E. Lancs. R.); Oct. 1st. A. Roberts, M.C. (Temp. Capt., Dur. L.I.), and to be Hon. Capt., J. E. Tomlinson (Capt., Ches. Yeo.), and to be Hon. Capt.; Oct. 2nd. E. N. T. Edwards (Lieut., R.F.A.), J. Inglis (Temp. Capt., R. Highrs.), and to be Hon. Capt.; Oct. 3rd. S. D. Antill (Temp. Lieut., R. Fus.); Oct. 6th. A. Rawlins (Lieut., Lancers); Oct. 11th. F. W. Irving (Lieut., Lancs. Fus., T.F.); Oct. 13th. K. Owen (Lieut., E. Lancs. R.); Oct. 14th. B. M. Machin (Lieut., W. Rid. R.); Oct. 16th. A. W. Rose, M.C. (Lieut., Essex Yeo.); Oct. 21st. J. H. G. McKee (Lieut., Seaf. Highrs., T.F.); Oct. 23rd. F. C. Clements (Qrmer. and Hon. Capt., R. Irish Fus.), and to be Hon. Capt., W. H. Crotty (Lieut., R. Irish Fus.); Oct. 26th. A. J. M. Fairbairn (Lieut., K. Af. Rif.), H. N. Stevens (Temp. Lieut., North'd Fus.); Oct. 28th. A. P. G. Vivian (Lieut., R. Fus.); Oct. 29th. J. Gerrard (Capt. and Qrmer., Gen. List), and to be Hon. Capt.; Nov. 1st. C. A. Howe (Lieut., R.A.); Nov. 4th. K. Nicholson (Capt., W. Rid. R.), and to be Hon. Capt.; Nov. 6th.

The following are granted temp. commns. as Sec. Lieuts., and to be actg. Lieuts. while employed as Lieuts.:—S. W. Lewis (Sec. Lieut., Worc. R.); April 1st. A. Tyler (Sec. Lieut., A.C.C.); April 23rd, seniority April 1st.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts.:—S. J. Croad; Aug. 26th. F. Salmon; Sept. 1st. C. L. Sharnan, from (T.); Sept. 24th. A. H. Silver, from (T.); Oct. 26th. C. N. Crutwell; Oct. 28th. H. D. Lumb; Nov. 4th. S. A. Knight; Nov. 5th. H. Dawes; Nov. 8th. W. J. Dayrell-Steyning; Nov. 9th. A. T. Cooper, P. Geach, from (T.); Nov. 11th.

The following are granted temp. commns. as Sec. Lieuts.:—A. M. W. Leyfield; July 8th. P. Perry; Nov. 18th.

Sec. Lieut. E. Hill is dismissed the service by sentence of a General Court-Martial; Aug. 24th.

Lieut. (actg. Capt.) H. B. Everest (Lieut., attd. R. War. R.) relinquishes his commn. on ceasing to be employed; Nov. 14th.

Sec. Lieut. R. M. Hillman resigns his commn.; Nov. 20th.

Sec. Lieut. G. A. Large resigns his commn., being physically unsuited for the duties of Pilot or Observer; Nov. 20th.

The initials of Maj. (actg. Lieut.-Col.) W. P. Alexander is as now described and not as stated on page 7071 of *Gazette* June 14th.

Technical Branch.

Maj. J. Dickson to be actg. Lieut.-Col. while employed as Lieut.-Col.; Nov. 4th.

Maj. H. A. Oxenham, M.C., to be Maj., from (S.O.); Nov. 4th.

W. G. Lawrie (Bt.-Col., R.E.) is granted a temp. commn. as Maj., and to be Hon. Col.; Nov. 16th, seniority April 1st.

To be actg. Capt. whilst employed as Capt.:—Lieut. W. D. Rhys, Sec. Lieut. (actg. Lieut.) H. N. Stradling; Sept. 1st. Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) L. W. Allen, M.C.; Nov. 7th. Capt. E. A. Power to be Lieut. from (A. and S.); Nov. 4th.

Lieuts. to be Lieuts.:—E. G. Pole, from (O.); Aug. 12th. E. C. Hucklebridge, from (A.); Oct. 30th. W. Hay, from (O.); Nov. 6th. C. J. M. Lowe (Temp. Lieut., R.E.) is granted a temp. commn. as Lieut.; Oct. 15th.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts.:—J. W. White; June 19th. R. J. Sladden; July 1st. (Hon. Lieut.) J. R. Brown, M.C.; Sept. 1st. (Hon. Lieut.) W. B. Rayner; Oct. 29th. E. A. Gater (Temp. Sec. Lieut., Tank Corps) is granted a temp. commn. as Sec. Lieut.; Sept. 30th, seniority April 1st.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. (Hon. Lieut.) F. M. Buller (Lieut., Rif. Bde.); Nov. 5th. Capt. A. T. Lee (Lieut., R.N.V.R.); Nov. 6th.

Medical Branch.

Maj. (actg. Lieut.-Col.) H. C. T. Langdon retains the actg. rank of Lieut.-Col. while employed as Lieut.-Col., from (S.O.); Nov. 6th. J. T. T. Forbes is granted a temp. commn. as Lieut.; Nov. 15th.

Dental Branch.

The following are granted temp. commns. as Lieuts.:—J. Jones, J. Wren; Nov. 15th.

Memoranda.

Maj. B. M. Jones, A.F.C., to be actg. Lieut.-Col. while holding a special appointment at the Ministry of Munitions; July 22nd.

Sec. Lieut. W. M. F. Sherwood to be actg. Capt. while holding a special appointment at the Ministry of Munitions; Oct. 3rd.

H. Fletcher (Lieut., Lancs. Fus., T.F.) is granted a temp. commn. as Lieut.; Sept. 23rd, seniority April 1st.

Lieut. K. Rawson-Shaw to be Hon. Capt.

Sec. Lieut. A. L. Pink to be Hon. Lieut.

R. R. Truscott (late Sec. Lieut., R.A.F.) is granted the hon. rank of Sec. Lieut.; Nov. 6th.

Lieut. T. J. Donovan to take rank and precedence as if his appointment as Lieut. bore date Sept. 19th.

Capt. J. Robertson (Capt., R. Sco. Fus.) relinquishes his commn. on ceasing to be employed; Oct. 31st.

London Gazette, November 22nd.

The following temp. appointments are made at the Air Ministry:—

Staff Officer, 1st Class.—Capt. (actg. Maj.) J. McIntyre, M.C., and to be actg. Lieut.-Col. while so employed; Nov. 7th.

Staff Officers, 3rd Class.—And to be actg. Capt. while so employed:—Sec. Lieut. (actg. Lieut.) D. B. Gunn, Sec. Lieut. (actg. Lieut.) J. Keyes; Nov. 12th.

Staff Officer, 4th Class.—C. H. Finnis (Temp. Sec. Lieut., R.E.) is granted a temp. commn. as Sec. Lieut., and to be actg. Lieut. while so employed; April 1st.

The following temp. appointments are made:—

Staff Officers, 2nd Class.—And to be actg. Maj. while so employed, if not already holding that rank:—Capt. (actg. Maj.) C. F. Yeomans; Aug. 26th. Capt. N. H. Bottomley; Sept. 19th.

Staff Officers, 3rd Class (P.).—A. Eggar (Lieut., R.A.) is granted a temp. commn. as Lieut.; July 10th, seniority June 10th, and to be actg. Capt. while so employed. (T.) Lieut. E. L. Hyde, and to be actg. Capt. while so employed; Sept. 28th. The rank of Capt. W. Ricketts is as now described and not as stated on page 12901 of the *Gazette* Nov. 1st.

Staff Officer, 4th Class (1st Grade).—Capt. C. W. C. Browne; Aug. 26th.

Staff Lieut., 3rd Class.—(P.) Lieut. L. L. Lindsay; Aug. 28th to Nov. 1st.

Flying Branch.

Maj. R. Chadwick, M.C., to be actg. Lieut.-Col. whilst employed as Lieut.-Col. (A.); Aug. 1st.

Capt. (actg. Maj.) E. A. O. Auldjo-Jamieson to be actg. Lieut.-Col. while employed as Lieut.-Col. (K.B.); Sept. 24th.

Capt. to be actg. Maj. while employed as Maj. (K.B.):—S. St. G. C. Belfield, B. E. P. Gregg, D.S.C.; L. W. M. Lloyd, T. F. Morris, T. R. Spence; Sept. 24th.

Capt. C. Gilmour to be graded for pay as Capt. while employed as Capt. (A.); April 1st.

Capt. to be graded for pay as Capt. while employed as Capt. (A. and S.): P. B. Silk; April 1st. B. H. Ramsden; Oct. 25th.

Capt. N. Grabowsky to be graded for pay as Capt. while employed as Capt. (A'ship.); Nov. 9th.

Capt. to be graded for pay as Capt. while employed as Capt. (K.B.):—E. Ball, H. S. Bompas, J. E. Brewin, C. A. Beck, G. F. Browne, G. B. Carr, W. J. Calderwood, N. H. Fletcher, M. G. Gill, J. G. Hudson, A. M. Harding, W. O. F. Harding, M. Hunter, T. C. Lloyd, D. C. Page, F. E. Rogers, N. E. Stirling, W. P. D. C. Scott, B. H. Sisson, D. C. Woods, N. Wallis, G. E. Williamson, J. W. Walton; Sept. 24th.

Lieut. J. A. Sully to be actg. Capt. (A.) whilst specially employed; April 18th.

Lieuts. to be actg. Capt. whilst employed as Capt. (A.):—E. F. McIlraith; Oct. 21st. I. G. Elias; Nov. 16th.

Sec. Lieut. M. Forsyth to be actg. Capt. whilst employed as Capt. (A.); Nov. 14th.

Lieuts. to be actg. Capt. whilst employed as Capt. (K.B.):—T. A. Byers, C. L. Bruce, H. Cubitt, H. Copley, E. W. Geer, A. Howard, C. Hayward, F. Kershaw, E. J. Keane, H. W. Lee, F. P. O. Mann, F. T. Muncey, G. Macfarlane, H. L. Murphy, W. G. Pegg, W. J. Rawson, H. C. Reeve, M. H. Whitelegge, T. H. Whitby; Nov. 6th.

Lieut. E. D. Harding to be actg. Capt. whilst employed as Capt. (O.); Oct. 29th.

Sec. Lieuts. to be actg. Capt. whilst employed as Capt. (O.):—R. P. Keely, (Hon. Lieut.) J. F. D. Tanqueray; Oct. 29th.

Lieuts. (Ad.) to be Lieuts. (A.):—A. J. Watson; Nov. 14th. L. J. N. Mackay; Nov. 16th.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (K.B.):—A. A. Barnes, J. Cranfield, A. Page, D. Smith, J. W. Watson; Nov. 6th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A.):—305069 F. D. Kendall; July 2nd. 520095 J. H. Lamb; July 13th. 458015 T. H. Blatchford; July 27th. 120678 E. H. Buxton; Aug. 8th. 506043 E. S. Alger, 446931 T. H. Little, 4409 J. R. Gibb, 99964 H. C. Webb; Aug. 21st. M2/229448 W. H. Herd, 94724 A. V. Dearden; Aug. 30th. 339419 W. W. Coates, 127693 S. L. F. St. Barbe; Sept. 26th. 540242 L. B. McMurtry; Sept. 28th. 154929 P. G. Kew, 154923 C. Polk; Oct. 22nd. 426412 W. J. Metcalfe, 2718 J. Laxdal; Oct. 28th. 3856 C. E. Parker, 156310 E. D. Drew, 100637 B. W. Joyce; Oct. 31st. 576167 A. V. Hale; Nov. 1st. 67058 D. W. S. Ireland; Nov. 3rd. 54120 C. Ashworth, 19991 L. B. Farmiloe, 100087 E. A. Liggins, 110154 J. McA. Allan; Nov. 5th. 518577 H. E. Brenack, 527 C. W. Wilson, 134208 F. L. James; Nov. 6th. 760339 W. A. Archibald, 100224 J. K. R. Walker, 117091 S. J. Henley, 767309 W. A. L. D. Glover; Nov. 7th. 924 N. Phillips, 524632 W. H. Settle, 302904 C. G. Paul, 117834 D. W. Welch, 535357 H. P. Bowring, 3/3913 A. S. Green; Nov. 8th. 117584 W. L. Alston; Nov. 9th.

Cadets are granted temp. commns. as Sec. Lieuts. (A.):—L. L. Allen, G. F. Anderson, J. C. Balletin, W. G. Banting, L. C. R. Batten, D. H. T. Blake, P. G. Cameron, W. E. Cane, R. D. Chalmers, C. A. Craig, W. V. Creaghan, I. C. Dandurand, N. W. Davidson, E. De Lorme, A. J. Doiron, J. P. Downey, J. S. Finch, F. J. Flahiff, O. R. Fulford, F. W. Glasby, T. I. Goodall, E. T. Griffith, C. F. Joyner, A. R. Lavell, W. F. Matthews, G. L. Mitchell, J. G. McCarthy, J. I. McNeil, J. F. Nelson, E. R. S. Nurse, R. J. Payne, G. H. Pearce, H. W. Perkins, E. L. Peters, M. Phillips, C. E. Revell, C. W. Riley, D. M. Rohrer, E. H. Searle, H. Smart, G. F. Smith, W. S. Soresby, Le R. Springstead, A. C. Thompson, F. L. Van Allen, R. L. Walker, D. E. Woolard, P. J. Young, E. G. Smith; Oct. 10th.

J. Helingoe is granted a temp. commn. as Sec. Lieut. (A.); Oct. 17th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A. and S.):—95395 T. A. Clarke; Sept. 23rd. 175471 S. C. Bennington, 175472 H. D. Christie, 175473 J. L. Davis; Nov. 2nd. 176537 H. W. McL. Hammond, 176583 C. F. Melville, 176517 B. B. Everitt, 176539 P. S. Henderson, 137960 E. J. G. Boyd; Nov. 9th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (A'ship.):—178060 J. Stephens; July 17th. 128896 H. Ogden; Oct. 15th. M2048220 J. D. A. Ness, 36629 H. J. Humphrey; Oct. 16th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—137591 J. B. Robson, 137117 C. A. Spooner, 110739 S. Perkins; Sept. 7th. 8771 R. E. Skinner; Oct. 10th. 73327 T. J. Egan; Oct. 20th. 188078 R. A. Forth; Oct. 26th. 30780 H. L. Bellamy, 527548 A. H. Coles, 178312 J. G. Davies, 760018 G. W. Green, 14258 L. S. Greenaway, 426431 H. Gates, P/5309 L. R. Lane, 505486 C. W. Pryne, M.M., 52855 W. A. Waite; Oct. 31st. 3135 N. Main, 16482 W. Trezise, 34395 R. Berry, 34652 P. J. R. Payne, 37277 F. Lake, 56425 N. A. W. MacQueen, 110918 W. J. Mitchell, 506045 J. B. Scott; Nov. 1st. 178117 A. Anderson, 178226 T. E. Ault, 260019 F. E. Bullock, 476442 F. A. Starling, 515807 L. G. Todd, Nov. 3rd. 742203 R. H. Paterson; Nov. 5th. 349384 H. D. Dewar, 76747 T. S. Benson, 128015 J. P. Fullarton, 128634 F. C. Hird, 176168 A. W. Amson, 176234 E. H. Firth, 223336 C. F. Hull; Nov. 7th. 137584 C. H. Moore, 176567 E. Barker, 778281 K. V. McKitterick; Nov. 9th. 175951 C. H. G. Fryer, 177716 O. Hopkins, 178555 F. W. Swain, 178731 G. H. W. Legge; Nov. 10th.

The following Cadets are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—L. P. Ashley, R. G. Bessey, B. R. Brinton, J. Copeland, F. J. Griffiths, D. H. Howland, W. J. Hoxworth, A. Kitchen, T. Moffatt, Jr., A. Tencer, H. H. Thomson, W. H. Vogan; Oct. 10th.

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (S.):—110861 C. J. McFadden, 494062 A. Waller; Nov. 8th.

Lieut. (Hon. Capt.) C. G. Davidson (Quebec R.) resigns his commn.; Nov. 23rd.

The surname of Lieut. (actg. Capt.) R. Grandy is as now described, and not Grady, as stated in *Gazette* Nov. 5th.

The Christian names of 177083 Flight Cadet Douglas McLay Ferrier are as now described, and not as in *Gazette* Nov. 12th.

The Christian names of 117497 Flight Cadet Anthony Innes Dodsworth are as now described, and not as in *Gazette* Nov. 12th.

The Christian names of 320017 Flight Cadet Gilbert Laurance Button are as now described, and not as in *Gazette* Nov. 15th.

The notification in *Gazette*, May 21st, concerning Sec. Lieut. D. P. Laird is cancelled.

The notification in *Gazette*, May 24th, concerning Sec. Lieut. J. S. Clark is cancelled.

The notifications in *Gazette*, May 28th, concerning Sec. Lieuts. H. L. Tamplin, M. L. Green, and P. R. Moore, are cancelled.

The notification in *Gazette*, May 31st, concerning Sec. Lieut. N. A. Weir is cancelled.

The notification in *Gazette*, June 4th, concerning Sec. Lieut. F. L. Le Lieve is cancelled.

The notifications in *Gazette*, June 7th, concerning Sec. Lieuts. G. C. C. Carr-Harris and W. C. Goudie are cancelled.

The notification in *Gazette*, June 14th, concerning Sec. Lieut. H. B. Oldham is cancelled.

The notification in *Gazette*, Oct. 4th, concerning Lieut. J. Wedgewood is cancelled.

The notification in *Gazette*, Nov. 5th, concerning Lieut. J. A. Stedman is cancelled.

The notification in *Gazette*, Nov. 8th, concerning Sec. Lieut. D. D. Carcary is cancelled.

Administrative Branch.

A. T. L. Nye (Fleet Paymr., R.N.) is granted a temp. commn. as Lieut.-Col.; April 1st.

R. H. Ferguson (Capt., actg. Maj., Irish Gds.) is granted a temp. commn. as Maj.; June 26th, seniority from April 1st.

Capt. (actg. Maj.) W. R. Mackenzie, D.S.C., retains the actg. rank of Maj. while employed as Maj., from (S.); Oct. 22nd.

The following are granted temp. commns. as Capt., seniority April 1st:—H. Burn-Murdoch (Capt., Camn. Highrs.); June 4th. W. E. Horan (Capt. and Qrmr., Gen. List); July 31st. J. W. J. Cremllyn (Temp. Capt., Welsh R.); Oct. 17th.

Lieuts. to be actg. Capt. while employed as Capt.:—G. H. Puckle; May 25th (substituted for notification in *Gazette*, July 30th. T. G. St. B. Baker; July 1st. H. M. Kendle; July 26th. J. H. Evans; Oct. 21st.

Sec. Lieut. (Hon. Lieut.) S. G. Manders to be actg. Capt. while employed as Capt., from (K.B.); Nov. 7th.

Lieuts. (A.) to be Lieuts.:—(Actg. Capt.) J. F. Byrom, and relinquishes actg. rank of Capt., R. S. Tippet; Oct. 31st. F. H. Jackson; Nov. 2nd. W. P. Harris; Nov. 11th.

Lieuts. to be Lieuts.:—L. Quartermaine, from (K.B.); June 8th. H. E. Gooding, from (O.); Nov. 5th. F. J. Titmas, from (O.); Nov. 13th.

A. Cleave is granted a temp. commn. as Lieut., and to be hon. Capt.; July 30th (substituted for notifications in *Gazette* Sept. 13th and Sept. 27th).

The following are granted temp. commns. as Lieuts., with seniority from April 1st:—Hon. J. E. de G. Henniker-Major (Temp. Lieut., Gen. List); July 31st. A. A. Bridgewater (Hon. Maj. and Q.M.R., Oxf. and Bucks L.I.), and to be Hon. Maj.; Aug. 4th. W. S. Hann (Lieut., R. Horse Gds.); Oct. 5th. H. C. Stanley (Capt., W. Yorks R.), and to be Hon. Capt.; Oct. 7th. D. A. Tomlinson (Temp. Lieut., Hants R.); Oct. 30th. S. P. Jacoby (Temp. Lieut., King's Afr. R.); Nov. 13th.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts.:—(Hon. Lieut.) D. B. Martin; Aug. 28th. R. N. H. Cole; Nov. 1st. (Hon. Capt.) W. La Brum; Nov. 8th. (Hon. Lieut.) G. Newton, from (T.), (Hon. Capt.), A. N. Wyatt; Nov. 11th.

J. J. McBrearty (Temp. Sec. Lieut., R. Dub. Fus.) is granted a temp. commn. as Sec. Lieut.; Sept. 30th (seniority from April 1st), and to be actg. Lieut. whilst employed as Lieut. (substituted for notification in *Gazette* Nov. 5th).

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts.:—G. V. Jennings, H. A. Fowkes; April 1st.

Sec. Lieut. R. R. Byrne to be Sec. Lieut., from (Tech.); July 12th.

E. B. Pym (Sec. Lieut., R.D.C., T.F.) is granted a temp. commn. as Sec. Lieut.; July 31st, seniority from April 1st.

The following are granted temp. commns. as Sec. Lieuts.:—A. G. Adams; July 1st. W. Smith; Nov. 6th. J. H. E. Weekes; Nov. 11th. A. G. Smith; Nov. 16th. D. A. Angus, C. E. Easton, G. Ercole, V. M. Evans, R. F. Fry, P. C. V. Halliwell, M. F. Hamilton, H. Hinchliffe, D. A. McCallum, W. G. Merrick, C. E. E. Raby, A. N. Ramsey, A. F. Perkins, J. G. Smithson (late Sec. Lieut., Gordon Highrs.), J. Tunbridge, C. St. J. Vaughan; Nov. 18th.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are granted hon. rank of Sec. Lieut.:—H. A. Fowkes, F. H. Whitlock; Nov. 23rd.

Sec. Lieut. C. H. Budd resigns his commn., being physically unsuited for duties of Pilot or Observer; Nov. 23rd.

Initials of Lieut. T. C. Wilkinson are as now described, and not as in *Gazette* Nov. 5th.

Technical Branch.

Capt. (Hon. Maj.) A. E. Hatton to be Capt. (Hon. Maj.), from (S.O.) Sept. 2nd.

The following are granted temp. commns. as Capt., seniority April 1st:—K. J. Young (Capt., R.E.); Sept. 5th. W. A. B. Laing (Hon. Capt., R.E. Services); Nov. 6th.

The following Lieuts. (actg. Capt.) retain actg. rank of Capt. while employed as Capt. (Grade A), from (Ad.):—C. W. Jamieson; Nov. 4th. P. R. Hutchinson; Nov. 10th.

Lieuts. to be actg. Capt. while employed as Capt. (Grade A):—W. Sutherland, from (K.B.); Aug. 28th. H. H. Chivers; Nov. 11th. E. Brown; Nov. 12th.

Sec. Lieuts. (actg. Lieuts.) to be actg. Capt. while employed as Capt. (Grade A):—H. J. L. Greatwich, T. Stevenson; Oct. 5th.

Lieuts. to be actg. Capt. while employed as Capt. (Grade B):—P. A. Barron; July 1st. J. S. Reid; July 31st. J. P. Barrett, A. G. Berry, E. A. B. Carter, W. R. Carrick, A. F. Hambly, W. L. Hill, D.S.C., F. R. H. Logan, G. C. C. Pentland, S. Purkis-Ginn, (Hon. Capt.) T. N. Weguelin; Aug. 1st. W. R. P. Allen; Aug. 28th. J. N. Longfield, M. Tod; Sept. 1st. E. M. Cashmore; Sept. 12th. G. M. Wingate; Oct. 4th. W. Oddey; Oct. 14th.

Sec. Lieuts. (actg. Lieuts.) to be actg. Capt. while employed as Capt. (Grade B):—(Hon. Lieut.) E. F. Boulbee, C. E. Hodges, W. R. Munro, L. M. Nava, C. G. Stevens; Aug. 1st. (Hon. Lieut.) J. C. Boughton, (Hon. Lieut.) J. A. Rossi; Sept. 1st. L. E. Carter, R. C. Clements from (Ad.), F. B. Woods; Oct. 4th.

Sec. Lieuts. to be actg. Capt. while employed as Capt. (Grade B):—(Hon. Lieut.) G. F. Antell, (Hon. Lieut.) P. M. George, J. Leyland, (Hon.

Lieut.) A. R. Mutter; Aug. 1st. F. J. Pope; Aug. 12th. Lieut. S. W. Symons to be Lieut. (Grade A), from (A.); Oct. 31st.

A. E. Bartlett (Hon. Lieut., R.E. Service) is granted a temp. commn. as Lieut. (Grade A); Aug. 13th, seniority April 1st.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Grade A):—F. G. Farrell; April 1st. (Hon. Lieut.) V. H. Tait; July 1st. J. J. B. Campbell, J. F. Earle, G. Kitchen; Aug. 1st. W. Muir; Aug. 9th. H. Buxton, T. G. Kennard, H. J. Lucas, S. H. Ryenolds, L. T. W. Sanderson; Oct. 4th. (Hon. Lieut.) E. J. Girdler, K. B. Sylvester; Oct. 5th.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Grade B):—R. Betts, A. R. B. Gill, H. W. Henchie; July 1st. F. A. Mills, F. B. Reed, (Hon. Capt.) W. W. W. Reilly, from (Ad.); July 31st. (Hon. Lieut.) J. C. Boughton, R. L. Burdon-Sanderson, C. S. Crocker, J. Corral, (Hon. Lieut.) A. J. Dick, (Hon. Capt.) S. K. D'A. de Ferrars, H. W. Dunk, W. E. Feldwick, (Hon. Capt.) F. Grave, D. F. Hollins, W. Hill, (Hon. Lieut.) F. G. A. Jones, D. C. Manuel, W. B. Morison, (Hon. Lieut.) H. H. Mitchell, (Hon. Lieut.) H. M. Over, (Hon. Lieut.) J. A. Rossi, A. W. Summers, C. G. Stevens, W. H. Spann, F. Wiltshire, W. W. Winterbottom; Aug. 1st. H. Hanson; Aug. 20th. F. M. Hewett, A. W. Hatfield, C. A. Longhurst, H. J. Thomas, J. West; Sept. 1st. F. H. Bartlett, (Hon. Lieut.) A. Daniels, C. J. F. Kynaston, A. E. Read, (Hon. Lieut.) P. S. Woodroffe, D. F. Winch; Sept. 12th. R. Guy; Oct. 1st. E. S. Baker, W. B. Francis, H. R. Hardy, (Hon. Lieut.) J. R. Jones, H. A. Paton, F. M. Pepper, W. P. W. Smith, A. H. Scaife, C. H. Strike, F. A. Skoulding, from (Ad.), T. Walker; Oct. 4th. F. J. Machennan; Oct. 20th. (Hon. Lieut.) F. H. Astle; Oct. 29th. A. F. Loveday; Nov. 1st. (Hon. Lieut.) H. J. O. Barnett, A. H. James, S. D. A. Jolly; Nov. 2nd.

The following are granted temp. commns. as Sec. Lieuts. (Grade A), seniority April 1st:—L. J. J. Muron (Temp. Capt., Gen. List), and to be hon. Capt.; June 6th. R. Alston (Capt., R.W. Kent R., T.F.), and to be hon. Capt.; Oct. 22nd.

Lieut. N. A. Ayres to be Sec. Lieut., and to be hon. Lieut., from (Admin.); Nov. 1st.

Lieut. R. G. Dalziel to be Sec. Lieut. and to be hon. Lieut., from (A.); Nov. 1st.

Sec. Lieuts. (Admin.) to be Sec. Lieuts. (Grade A):—B. Williams; June 1st. W. B. Fredericks; July 1st. E. W. Shaw; Oct. 17th. H. L. Vahey; Oct. 23rd.

H. W. Sharman (Sec. Lieut., E. Surr. R., T.F.) is granted a temp. commn. as Sec. Lieut. (Grade B); Oct. 26th, and seniority April 1st.

To be Sec. Lieuts. (Grade B) and to be Hon. Lieuts., from (A.):—T. J. Benson, E. J. C. Bockett, S. Field; Oct. 26th. W. E. Goodyear; Nov. 4th. P. Alden; Nov. 9th. J. Murch; Nov. 10th.

To be Sec. Lieuts. (Grade B), and to be Hon. Lieuts., from (O.):—C. E. Kenedy, G. L. Ziegler; Oct. 26th. N. H. de V. Heathcote; Nov. 2nd.

To be Sec. Lieuts. (Grade B), and to be Hon. Lieuts., from (Admin.):—C. D. B. Stiles; Oct. 18th. D. J. W. Page; Nov. 10th.

Sec. Lieuts. (Admin.) to be Sec. Lieuts. (Grade B):—B. J. Beech, H. W. Davidson; Sept. 7th. H. S. Shaw, A. F. B. Cannon; Oct. 1st. R. E. Pudney, S. Maunder, H. T. Mackie, C. H. Ivatts, W. Best, G. F. Mitchell; Oct. 2nd. A. L. Hookham, R. S. Lewis; Oct. 8th. R. G. Wells, S. S. Dillingham, D. Rawley, W. H. Hitch, C. M. S. Churchill, H. Ellingham, A. C. Merriell, D. J. Beaumont; Oct. 9th. E. R. Veneer, F. D. D. Gaussen, H. Gamage, J. H. Davie, J. A. Currie, L. H. Skelton; Oct. 12th. T. A. G.

Strickland; Oct. 20th. J. Winslow; Oct. 26th. F. W. Waller; Nov. 1st. A. Cole, G. Workman; Nov. 9th. G. H. Ellis; Oct. 30th. P. D. Hind, P. F. Cullen; Nov. 5th.

Sec. Lieut. (Hon. Lieut.) E. M. Wood to be Sec. Lieut. and to be Hon. Lieut.; Nov. 7th.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (Grade B):—A. E. Elmes; Sept. 7th. R. E. Townshend; Oct. 2nd. C. F. Murrin, R. M. Langley; Oct. 12th. C. W. Tuck; Oct. 18th. A. R. M. Carse; Oct. 26th. P. E. Towler; Nov. 7th.

Sec. Lieut. A. W. R. Trusler (late S.R., R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (Grade B); Sept. 7th.

J. W. Lockhart is granted a temp. commn. as Sec. Lieut.; Nov. 18th. The surname of Sec. Lieut. (actg. Lieut.) McL. N. Staigh is as now described, and not as in *Gazette* Nov. 5th.

Medical Branch.

The following are granted temp. commns. as Capt. :—P. J. Flood (late T. Capt., R.A.M.C.); Nov. 20th. D. J. Cannon, C. L. McDonogh; Nov. 21st.

The following are granted temp. commns. as Lieuts. :—J. W. Healy; Nov. 18th. A. Briscoe, M. M. Price; Nov. 19th. M. J. Smyth; Nov. 20th. E. G. O'Gorman; Nov. 21st.

Dental Branch.

A. G. Marks is granted a temp. commn. as Lieut.; Nov. 13th.

Chaplains Branch.

The following are granted temp. commns. as Chaplains with the relative rank of Capt. :—Rev. J. A. Chesterton; Nov. 18th. Rev. E. A. Gillespie (late Temp. Chaplain to the Forces, 4th Class, A.C.D.), Rev. G. F. Naylor; Nov. 19th.

Memoranda.

Capt. G. Ralston to be actg. Maj. whilst holding a special appointment at the Ministry of Munitions; Nov. 1st.

Capt. C. O. F. Modin, D.S.C., is granted the hon. rank of Maj.; Oct. 25th.

Capt. (Temp. Maj.) F. J. Baker relinquishes his commn. on account of ill-health; Nov. 23rd.

Royal Flying Corps (Military Wing).

London Gazette Supplement, November 19th.

Flying Officer.—The appointment of Temp. Sec. Lieut. D. D. McQuat, Grn. List, is antedated to Feb. 2nd.

London Gazette Supplement, November 21st.

Flying Officers.—Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—R. C. Henderson; Feb. 27th. H. W. Allen; March 9th.

London Gazette Supplement, November 24th.

Flying Officers (Observer).—Lieut. J. C. Currie, M.C., R.F.A., S.R., vacates his appointment; March 17th.

General List.—H. M. C. Drummond-Wolff to be Temp. Sec. Lieut. (on prob.); Oct. 22nd, 1917 (substituted for notification in *Gazette*, Nov. 19th, 1917).

London Gazette Supplement, November 25th.

Experimental Officer, 1st Class (Graded as an Equipment Officer, 1st Class).—Sec. Lieut. (Temp. Lieut.) D. R. Pye, S.R., from an Equipment Officer, 2nd Class, and to be Temp. Capt. while so employed; March 26th.



Casualties

Capt. D'URBAN VICTOR ARMSTRONG, D.F.C., R.A.F., who was killed in France on November 13th, was the younger son of George S. Armstrong, Empangeni, Zululand, South Africa, and brother of Mrs. Edward A. Royds, Reed Pond House, Gidea Park, Essex.

Lieut. WILBUR ARNOLD JOHN, R.A.F., who was first reported missing and then killed on July 31st, was the younger son of Mr. and Mrs. Richard John, of Valparaiso, Chile, where he was born in 1895. Although he had only recently arrived in Valparaiso, having been eight years in Europe to complete his education, he volunteered immediately on the outbreak of war for service, and left with the first contingent to return to England to enlist. After training with the Inns of Court, he received his commission in the spring of 1915, and was gazetted to the Sussex Yeomanry. Being a good linguist, he was advised to join the Intelligence Corps, and after completing his course with merit, he obtained an appointment in the Intelligence Dept. of the Northern Army. In September, 1915, he was sent to France, and was attached to the Seventh Corps, and completed his final course in the first firing line with the 1st/6th Staffordshire Regt. In the following January he was attached to the 18th Corps. Desiring more active duties, he decided to transfer to the Royal Air Force at the beginning of this year. He completed the course for observer in July, and was sent to France, where he remained until his death.

Sec. Lieut. FREDERICK LAWRENCE PERCY SMITH, who was killed in action on November 9th, was the only child of Mr. and Mrs. F. Smith, of Jesmond, Vicarage Road, Leyton. Lieut. Smith was 18 years of age, and was one of the old Connaught boys of Leytonstone. He was shot through the body whilst acting as observer in one of the last raids over the German lines made by his squadron.

Lieut. JOHN WEBSTER, M.C., 14th Squadron, R.A.F., who was killed in action in Palestine on September 21st, was the only son of Dr. J. A. Webster, late of Launceston and Sorell, Tasmania.

Capt. FREDERICK ("ERIC") WOODCOCK, M.C., R.A.F., who was killed in action on October 31st, aged 21, was the only son of Mr. F. A. Woodcock, solicitor, and Mrs. Woodcock, of "Ravenswood," Whalley Range, Manchester. He was educated at Riber Castle, Matlock, and at Harrow School. After leaving Harrow in July, 1914, he matriculated at the Victoria University and subsequently at the London University (First Division), and was articled to his father, passing the intermediate examination for his LL.B. degree in June, 1915. In August, 1915, he received his commission in the R.G.A., and went to France (Ypres) in the following November. In April, 1917, he was attached to the R.F.C., and in the following September was awarded the Military Cross. He was promoted Flight Commander about two months ago.

Capt. PHILIP WYNDHAM BRODIE, 1st Seaforth Highlanders, attached R.A.F., who died on November 18th in hospital at Taranto from pneumonia, aged 31, was the youngest son of Mr. and Mrs. Brodie, Woodlands, Cheltenham.

Capt. HENRY PAUL DUNDAS HELM, R.A.F., late Border Regt., who died from illness contracted on active service on November 6th, aged 24, was the eldest son of Dr. and Mrs. Helm, of Portland Square, Carlisle. He was educated at Lime House Preparatory School, Wetheral, and Repton, where he was a member of the O.T.C. On leaving school he went up to Trinity College, Cambridge, and in 1914 he began the study of medicine at Edinburgh University, where he passed the first M.B. examination. When the war broke out he at once volunteered for active service. He was gazetted

to the Border Regt., and went out in November, 1914, to join the 2nd Battalion, with which he took part in the severe fighting of that winter and the following year. In March, 1916, he was promoted captain, and shortly afterwards transferred to the R.F.C. After qualifying as an observer he had nine months' continuous flying service, taking part in the first battle of the Somme. In 1917 he was promoted wing adjutant, and after doing duty at home stations he returned to the front last June as a wing adjutant in the Independent Air Force. During the recent fighting he had done excellent service, which received the high commendation of his commanding officer. Under the strain of this heavy work his health gave way, and he was invalided home.

Capt. F. H. HODGSON, R.A.F., who was killed on November 19th while flying in France, aged 22, was the only surviving son of C. H. Hodgson, Wharton, Sherborne.

Capt. JOHN LESLIE HORRIDGE, R.A.F., who was killed while flying in England, aged 22, was the youngest son of Mr. and Mrs. John Horrridge, Bolholt House, Bury, and of Plas Llanfair, Llanfair P.G., Anglesey.

Capt. ARTHUR MAUGHAN HUMBLE-CROFTS, R.A.F., who died on November 19th at the Military Hospital, Castle Mount, Dover, from pneumonia following influenza, was the fourth son of Prebendary and Mrs. Humble-Crofts, of Waldron, Sussex, and husband of Margaret Humble-Crofts (née Margaret Cooper), of "Framba," 103, Dartmouth Road, Willesden Green, N.W. He was aged 35.

Lieut. LEO A. KIBURZ, R.A.F., who died on November 24th at Heatherton Hall, Iwer Heath, Bucks, of pneumonia following influenza, was a nephew of Gen. J. W. Stewart, Canadian Railroad Troops, France.

Lieut. ALFRED GEORGE BATHURST NORMAN, R.A.F., who was accidentally killed whilst flying in France on November 20th, aged 19, was the eldest son of the Rev. Harry Bathurst Norman, 10, Palmeira Square, Hove.

Maj. EDWARD PELLEW PLENTY, R.A.F., who died from pneumonia following influenza, at Huntingdon, on November 21st, aged 21, was educated at the Newbury Grammar School and St. Paul's School. On leaving school he enlisted in a Public Schools Battalion in September, 1914, at the age of 17, and receiving a nomination for Sandhurst he entered in November, 1914, and there became senior sergeant of G Company. On passing out he was gazetted to the Manchester Regt., but having volunteered for flying he was sent at once for instruction, and on gaining his wings joined a squadron in France. In April, 1916, he was made flight-commander, being then 18 years old. He returned to England in May, and helped to train a new squadron then being formed at Huntingdon, with which he went out again to France in October, 1916. After serving a period there he was employed as flying instructor in Norfolk, and went from there to York as brigade examining officer to the Northern Training Brigade. He was promoted to his majority last May, when he was only 20, and was given a squadron in October. He was twice mentioned in despatches.

Capt. HENRY THORNBURY FOX RUSSELL, M.C., R.A.F., late 6th Royal Welsh Fus., who was killed on November 18th in an aeroplane accident, aged 21, was the third son of Dr. and Mrs. Fox Russell, Holyhead, and brother of the late Capt. John Fox Russell, V.C., M.C., Royal Army Medical Corps.

Capt. VERNON FRANCIS SYMONDSON, R.A.F., late R.N.A.S., who was accidentally killed in France on November 13th, aged 25, was the eldest son of the late Mr. and Mrs. S. V. Symondson, of Walton Lodge, Banstead, Surrey.

Lieut. CHARLES E. WODEHOUSE, R.A.F., who died at Eastchurch on November 18th as the result of an aerial collision, aged 19, was the fourth son of Guy and Elisa Wodehouse, of Culipran, Chile, nephew of Maud Lambert and Ethel Wodehouse.

Capt. J. C. WOOLLETT, R.A.F., who died of pneumonia on November 16th, at Hythe, was the son of Dr. and Mrs. Woollett, of Streatham.

Married

Capt. C. J. FOOT, R.F.A., attd. R.A.F., third son of Mr. and Mrs. W. H. Foot, 36, Carlton Road, Putney, was married on November 16th at St. James's, Piccadilly, to MARGARET CECIL MATHESON (PEGGY), youngest daughter of Dr. and Mrs. BOXILL, of Buttsalls, Barbados.

Lieut. REGINALD GOSSE, R.A.F., youngest son of the late Dr. Gosse, of Wallaroo, S. Australia, was married on October 15th at St. Stephen's, Gloucester Road, W., to HELEN LIZETTE, youngest daughter of Mr. and Mrs. GORDON JONES.

Dr. EDWARD F. MEISTER, American Air Force, Chingford, and Buffalo, New York, U.S.A., was married on November 24th, by special licence, at Lloyd's Park Church, Walthamstow, to MABEL C. HOPE, of 127, Hoe Street, Walthamstow.

Major KEITH R. PARK, M.C., C. de G., R.A.F., R.F.A., was married on November 25th at Christ Church, Lancaster Gate, to Miss DOROTHY MARGARITA ("DOL") PARISH.

Capt. STUART H. PRATT, R.A.F., only surviving son of Mr. and Mrs. George Pratt, "Carrick," Streatham Park, S.W., was married on November 21st at St. Leonard's, Streatham, to MAY, daughter of Mr. and Mrs. A. C. WOODWARD, 34, Criffel Avenue, Streatham Hill.

Lieut. F. C. YANDELL, R.E.K. Yeo, and R.A.F., elder son of Rev. F. F. Yandell, B.D., LL.D., and Mrs. Yandell, St. Helier, Jersey, was married on November 2nd, by special licence, to GLADYS MAY, eldest daughter of Mr. and Mrs. HANCOCK, Ivy House, White Roding.

To be Married

A marriage has been arranged, and will shortly take place between Maj. DUDLEY GARDNER, R.A.F., only son of Capt. and Mrs. G. J. E. Gardner, Alverton, Northallerton, and GLADYS MARJORIE, second daughter of Mr. and Mrs. J. A. TAYLOR, Ailesbury Road, Dublin.

The engagement is announced, and the wedding will shortly take place, between Maj. FREDERICK CHARLES VICTOR LAWS, Lincolnshire Regt. and R.A.F., and MADELINE GRACE MATHEWS, daughter of Mr. and Mrs. S. WITHERS, Port Hill, Shrewsbury.

Item

Miss WARNER, of Thorp Arch, Boston Spa, Yorks., will be extremely grateful for any information concerning her brother, Lieut. T. W. Warner, R.A.F., who was reported missing on October 4th, 1918, and is now reported killed in action. He was last seen fighting three Fokker biplanes.

AVIATION IN PARLIAMENT.

Irish Enlistments in the R.A.F.

Mr. BOLAND, on November 18th, asked the Under-Secretary of State to the Air Ministry whether he will take steps to ascertain the exact number of men of Irish birth who were serving in the Flying Forces at the outbreak of war, and of those of Irish birth who subsequently were enlisted in any capacity under the Air Ministry or its predecessors in Ireland and in Great Britain?

The Under-Secretary of State to the Air Ministry (Major Baird): The number of men of Irish birth in the two branches of the Flying Service at the outbreak of war was 42; the number at present serving is 5,464.

W.R.A.F. Officers' Uniform.

Mr. WATT asked the Under-Secretary of State to the Air Ministry what is the cost of a uniform for an officer of the Women's Royal Air Force; how many of these have been issued up to any recent date; and whether any attempt was made by his Department to institute competition for the supply of these so that due economy of money should be attained?

Major Baird: Officers of the Women's Royal Air Force draw an outfit allowance, and no issue of uniform is made in kind. The estimated cost of the uniform required by the regulations of the Force is—blue uniform, £20 16s. 6d.; khaki uniform, £19 17s. The number of officers so far appointed is about 360. It is open to any officer to stipulate at the time of ordering new uniform that it shall be made of cloth to which controlled price arrangements apply.

Mr. Watt: What is the amount of the allowance?

Major Baird: The reply says £20.

Prisoners of War at Hollinwood Aerodrome.

Capt. CRAIG asked the Under-Secretary of State for War what is the

amount paid per hour to German prisoners of war now or lately employed in the construction of the aerodrome at Hollinwood, near Oldham?

Mr. J. Hope: I am informed by the military authorities that these men are interned aliens, and as such receive the full local rate of wages, less the amount charged to them for board and lodging.

Dismissal of W.R.A.F. Commandant.

COL. LORD HENRY CAVENDISH-BENTINCK asked the Prime Minister whether the Government will at once publish the results of the enquiry into the grounds of the summary dismissal of the commandant of the W.R.A.F.?

Major Baird: A private enquiry was carried out by a member of the Prime Minister's secretariat. It is not proposed to publish his report.

Airship Sheds, Rye.

Mr. RAMSAY MACDONALD, on November 20th, asked the Under-Secretary of State to the Air Ministry whether it is proposed to continue the construction of airship sheds near Rye with R.A.F. men working for military pay and under military conditions, or whether, in the event of these sheds being still required, the men working upon them will be demobilised and discharged, and then employed as civilian workmen?

Dr. Macnamara: I have been asked to answer this question. The sheds referred to are portable airship sheds, one of which is already completed; the other will be completed in the course of the next few days. My hon. friend is under a misapprehension as to the labour employed in the construction of these sheds. They have been constructed by civilian labour under contract, and the R.A.F. personnel are only employed in the erection and moving of the sheds after delivery.

SIDE-WINDS

ONE of the signs that Christmas will be upon us very soon is that Gamage's Bazaar is open. This year the walls of the Great Toy Hall have been hung with a series of specially painted pictures illustrating the doings of "Gulliver" among the inhabitants of Lilliput, while in the centre of the hall there is a splendid model of Lilliput town. In addition, there are demonstrations of a large variety of constructional toys and hundreds of other delights for boys and girls of all ages. In the other departments will also be found innumerable articles, useful and ornamental, suitable for Christmas presents, including electro-plate, handbags, household utensils, clothing, &c. Although the armistice has been signed, it must be borne in mind that a very large number of "boys" of our fighting forces will have to spend another winter abroad, and will welcome such things as socks, scarves, cardigan jackets, gloves—all of which can be had at Gamage's.

CONTRACTORS and sub-contractors who have more planes or spares in hand than they can cover and dope in time to keep pace with their delivery schedule should bear in mind that Messrs. Aero Coverings, Ltd., whose headquarters are at 175, Piccadilly, W. 1, made a speciality of this work, and can probably help them out with any difficulties. Their telephone call is Gerrard 2312.

A CHANGE of name to note. We understand that the Pulvo Engineering Co., Ltd., has recently been acquired by the Whitfield Aviation Ltd., a new company specially formed for the purpose. In the meantime, they are carrying on exactly as hitherto, but before long they hope to have the advantage of a newer and much larger factory. The rights in the trade-mark "Pulvo" and in the goodwill attaching to the name have been taken over by Whitfield Aviation, Ltd., and the management remains as before, in the capable hands of Mr. Harry Whitfield, who is the managing director of the new company.

A NOTE comes from Mr. A. J. A. Wallace Barr to remind his friends that the refills for 1919 for the Cellon calendar are now ready, and he will be pleased to forward one to any aeroplane manufacturer who applies to Cellon, Ltd., at 22 Cork Street, London, W. 1.

IN aid of St. Dunstan's Hospital for soldiers blinded in the War, the staff of Mr. R. W. Coan, in conjunction with the Comptometer Club, are holding a Victory dance at the Holborn Hall, Grays Inn Road, on Wednesday, December 11th. Tickets, 3s. each, can be obtained from the honorary secretaries, Miss Higgins, 219, Goswell Road, E.C. 1, or Miss Jameson, Comptometer Club, Central House, Finsbury Square, E.C. 2. The dance commences at six o'clock, and fancy or evening dress, or uniform, are optional.

UNDER the assiduous management of Mr. Fred. A. Coulson, the Aero Parts Manufacturing Co., of King's Cross, London, N. 1, still continues to go ahead in a variety of ways. The arrival of much needed plant has lately enabled them to extend their wood-working so that from now they will be able to claim to be actual makers of all components from a single fitting to a complete unit, either in metal or wood. As is well-known, the firm make a speciality of D.H. parts, and their weekly output is now very large indeed. They are also making a speciality of units for large bombing machines.

ON November 22nd, at Aberdeen Lane, Highbury Grove, N. 5, the extensive Balloon Hall which has been erected by Messrs. C. G. Spencer and Sons, Ltd., the well-known aeronautical engineers, was opened by Mrs. L. T. Spencer, wife of Mr. Arthur C. Spencer, chairman of the company. A large assembly of the heads of the departments and the staff were present, and Mr. E. Allen, managing director, said he had the greatest pleasure in asking Mrs. L. T. Spencer to lay the opening stone and to declare the new works ready for occupation. Mrs. Spencer then duly laid the stone, and in a neat speech wished success to the new venture and although the war was over, she hoped that there would be plenty of work for everyone. Miss Cavanagh then presented Mrs. Spencer with a very handsome bouquet of carnations. Mr. Arthur Spencer, chairman of the company, thanked the heads of the departments and working staff of the firm who had so readily carried out their duties during the very trying period of the war. He hoped that now the firm was about to turn to more peaceful undertakings that the same good feeling would exist and that work would be found for a very large number of employees who had been brought together during the long war period.

COMPANY MATTERS

Humber, Ltd.

PRESIDING at the annual meeting on November 20th at the works at Coventry, Sir Edward Powell, reviewing the company's prospects, said that to date the output of the works, mainly consisting of munitions of war, had exceeded that of any previous corresponding period. They were as quickly as possible reorganising the works to enable them to provide for the piping times of peace, which they were all joyfully anticipating within a few weeks' time. They had every reason to hope for a larger trade than they had hitherto known, and corresponding results in the way of profits earned. The formation of joint councils of employers and workmen, as advised by the Whitley Report, should do much to secure harmony, so that all alike might benefit by the great boom in trade. Of that there is every appearance. The vast destruction of property and the depletion of stocks due to the war must lead to unprecedented demands for all commodities, and consequent prosperity in pretty well all branches of industry.

Earl Russell seconded the motion, and it was carried.

Mr. W. B. Jessopp was re-elected a director.

NEW COMPANIES REGISTERED.

DUPLEX ENGINES, LTD., 68, Bridge Street, Manchester.—Capital £5,000, in £1 shares. Cycle, motor, aircraft and general engineers, &c. First directors: T. A. N. Leadbetter and A. I. Knox-Gilchrist.

HAMPSHIRE WOODCRAFTS, LTD.—Capital £3,000, in £1 shares. Acquiring the business of manufacturers of aeroplanes and aeroplane parts carried on at Wharf Road, Bournemouth, as "The Bournemouth Aviation Co., Ltd."

Aeronautical Patents Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

Applied for in 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published November 28th, 1918.

5,995. J. VEDRINES and L. L. ASTOUX. Wing systems for aeroplanes.

15,788. H. KATAYAMA. Raising submerged vessels by means of aircraft.

16,424. W. H. DAVIS. Inclination indicator for aircraft, &c. (120,275.)

18,865. S. E. SAUNDERS. Airships. (120,298.)

Applied for in 1918.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published November 28th, 1918.

1,715. C. A. JOHANSSON. Stabilising devices. (120,311.)

NOTICE TO ADVERTISERS

In order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

If you require anything pertaining to aviation, study "FLIGHT's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages lvii, lviii, lix and lx).

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